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THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED

THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER:

ELECTRO-PLATERS REVIEW

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A MONTHLY JOURNAL RELATING TO THE METAL AND PLATING TRADES

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ELECTRO-PLATERS REVIEW

Vol. 17 NEW YORK, JUNE, 1919 No. 6

AMERICAN ELECTRO-PLATERS' SOCIETY CONVENTION

A DESCRIPTION OF THE METAL PLATING AND FINISHING SHOPS OF PHILADELPHIA, THE CONVENTION CITY FOR 1919—THE CONVENTION WILL BE HELD AT THE BELLEVUE-STRATFORD HOTEL.

(Written for THE METAL INDUSTRY by George Goodfellow, Business Correspondent.)

Benjamin Franklin, pioneer electrical engineer and efficiency expert of America, deserves to rank as the owner of the first electro-plating plant in Philadelphia or in the world, according to the firm belief of several members of the local branch of the American Electro-platers' Society. Although Franklin died in ignorance of the nature of electro-chemical reactions and never put the plating art into commercial practice, it is expected that efforts will be made at the Philadelphia convention of the association in July to have Franklin's name enrolled as an honorary post-mortem member.

According to the gossip, curio hunters digging in a back yard on the site of Franklin's old home on Second street recently unearthed some chapters of the great man's Autobiography which were never printed, giving further details of many electrical experiments carried out by him.

About the year 1748, it appears, Benjamin had a cat which he named Electra because her back could produce the sparks for experiments. He loved Electra so much that he fed her milk in a silver saucer. Franklin himself was frugal and wore brass buckles on his shoes.

According to the records, Electra would lap the milk from the silver saucer while her master rubbed her fur for electricity. Occasionally between laps of the milk the cat would lick the buckles of Franklin's shoes. One day he noticed his buckles had changed color and on investigation found they were silver plated. A chemical analysis of this story is being made by several members of the association who are on the faculty of the University of Pennsylvania.

Anyhow, whether or not this account proves to be scientific, Philadelphia has some electro-plating plants as old as any in America. This city has been the leading workshop of the world ever since manufacturing industries took a prominent part in modern civilization. There are in the city a number of old established silversmith and jewelry houses which adopted electro-plating methods as soon as they were made commercially practical.

BENJAMIN FRANKLIN'S CAT, ELECTRA, THE FIRST ELECTRO-PLATER.

She lapped her milk from a silver saucer and then licked the buckles on his shoes, thereby silver-plating them by "cat-a-lick-tic" (catalytic) action.

The J. E. Caldwell Company, whose plating and polishing room is in charge of Otto W. Mott, president of the Philadelphia branch of the association, was established about eighty years ago, and very early used electro-plating processes in their work. This firm has a magnificent display store at Chestnut and Juniper streets, and maintains a complete repair plant on the premises, as well as a jewelry and plate manufacturing plant in another part of the city.

In 1852 John Meadows, an Englishman, established what was probably the first electro-plating shop for job work in the city at 310 Chestnut street, a neighborhood now built up with large banking and brokerage houses. After eight years he moved to 108 South Eighth street, where he continued about 10 years. Locations of the business following that were 20 North Ninth street, 810 Sansom street, 1203 Sansom street, and 214

South 12th street, the headquarters at the present time.

John Meadows died 21 years ago but the business has been continued in his name by H. H. Klineberg, who started work under Meadows many years before his death. Mr. Klineberg has been a member of the local electro-plater's branch since its organization. Silver-plating and light repair work are done at the downtown shop, and the heavier work and the plating on musical instruments, of which the firm does a great deal for another manufacturer, are done at 33rd and Walnut streets.

One of the largest jobbing and manufacturing plants in the city is that of the Biddle Gaumer Company at 3846 Lancaster avenue. The business was established in 1882 and incorporated in 1890. In 1893 the firm bought out and consolidated with the Joseph Neumann Company, located at Eleventh and Race streets. This firm was first established as Wilhelm and Neumann in the early Sixties, and was one of the pioneer jobbing shops for electro-plating work. The Biddle Gaumer Company do job work in connection with their regular business of manufacturing electric and gas lighting fixtures. They employ about 150 people.

INDEPENDENCE HALL, PHILADELPHIA, PA.

According to a census of Philadelphia industries taken in 1882 there were five separate establishments for electro-plating work, employing 59 persons in all, and doing an annual total business of $88,500. Besides these job shops there were a number of electro-plating departments connected with large manufacturing establishments.

Electro-plating processes are undoubtedly applied to more different lines of industry in Philadelphia than in any other American city. Within its boundaries proper are more than 450 distinct plants engaged exclusively in the metal industries, and in what is known as the Philadelphia district along the Delaware River are hundreds more. In 1914 the census recorded 8454 manufacturing establishments of all combined industries in the city. This number has grown during the war.

Philadelphia has the world-wide reputation of making almost everything. Her metal products range from hooks and eyes, tuning forks and surgical instruments to battleships, locomotives and airplanes. Electro-plating is used extensively in the manufacture of phonographs, silverware, hardware, locks and safes, novelties of all kinds, electrical appliances, gas light fixtures, fine instruments and an endless line of metal goods that require a fine finish.

Consequently Philadelphia is a wide field for the expansion of the Electro-Platers Association. Hundreds of men would be eligible for membership in the local branch, which now numbers about 65. Among the honorary members is Dr. Edgar Fahs Smith, provost of the University of Pennsylvania, and a widely-known authority on metallurgy and chemistry.

During the war Philadelphia was a leader in the production of rifles, heavy and light artillery, airplanes, naval materials, and ships both for the navy and merchant marine. The Delaware River for 25 miles in each direction from the city has become the greatest shipbuilding center in the world, and all the yards still continue to be busy. Every few days a ship is launched into the river.

In eleven different shipyards there are 125 ways. The largest yard is that of the American International Shipbuilding Company at Hog Island with 50 ways for merchant ships. The next in size is the New York Shipbuilding Corporation yard at Camden, just across the river from Philadelphia. This yard has 20 ways, and is the largest permanent yard equipped for building and fitting all classes of ships. This yard and the William Cramp and Sons Engine and Shipbuilding Company yard have built scores of torpedo-boat destroyers. The Hog Island yard is an erecting or fabricating yard and does not cut the steel plates and material nor build engines and equipment. The total number of men employed in shipbuilding in the Philadelphia district is more than 100,000.

The great amount of shipbuilding and munition work have caused a situation in the labor market that is still felt by many lines of the metal industries which were not devoted strictly to war work. The high wages yet being paid hold men away from plants doing commercial work that must compete with the products of other localities not forced to pay extremely high wages. Eighty cents an hour is the standard rate for mechanics in the shipyards. Many men getting this pay were only helpers or roustabouts before the war.

Some electro-plating shops have been particularly

NATIONAL OFFICERS OF THE AMERICAN ELECTRO-PLATERS' SOCIETY — 1918-1919.

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Founder.

WALTER FRAINE,
President.

OSCAR E. SERVIS,
Secretary-Treasurer.

H. I. RICHARDS,
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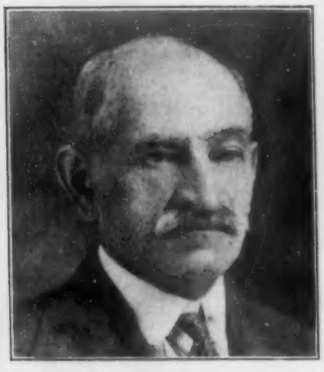

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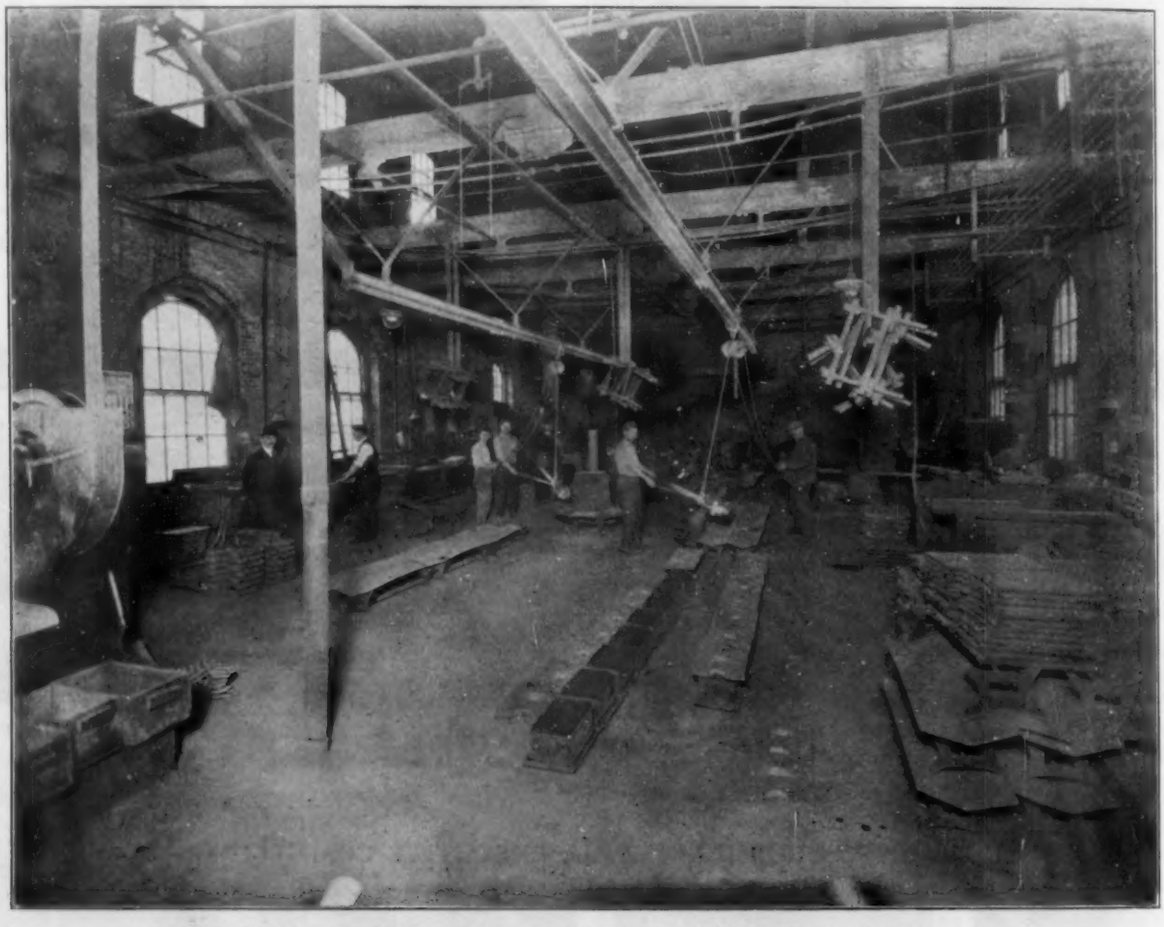
Chairman of Entertainment.

E. T. HOMAN,
Chairman of Reception.

W. P. SCOTT,
Chairman of Exhibits.

affected by this condition, many of them at present running only on one-half or two-thirds capacity because of a shortage of skilled and reliable workers. Women have been employed wherever possible, and labor-saving appliances have been installed in many places.

Sea-going ships are of course not silver or nickel-plated as a rule, and electro-plating plants are not used to any extent at the shipyards. The only one worth mentioning is at League Island Navy Yard which is used in connection with the aircraft factory there. Naval airplanes are equipped with many parts which are coated with zinc or copper by electro-plating process to prevent rust in service. This plant employs only a few men.



SECTION OF THE FOUNDRY OF THE WELSBACH COMPANY, GLOUCESTER, N. J.

It is in charge of C. V. Bayer, a member of the Philadelphia branch of the association.

A very interesting and well-equipped little plant for electro-plating and polishing is operated in the Bellevue-Stratford Hotel, where the convention is to hold its sessions next month. The work done is strictly private—repairing and touching up the tableware and plate used in the hotel service. Fred C. Clement, a member of the association, is in charge.

Undoubtedly the largest, most complete and finest plant in the neighborhood and possibly in the world is that of the Victor Talking Machine Company at Camden, eight minutes ride by ferry from Philadelphia. It is not known how many people are employed in the plating and polishing shops, but the total number of Victor employees in all departments is said to be over 10,000.

Virtually all the metal parts of a phonograph exposed to view are nickel or silver plated and highly polished, but the most delicate and important parts of the electro-plating work in the canned music business concerns the manufacture of the records.* The first record made in the receiving instrument when a singer or an orchestra renders a selection in the studio is on a revolving disc of soft wax.

This wax record is carefully covered with fine powdered graphite, placed in an electro-plating tank and subjected to a weak current for 40 or 50 hours so as to have a very fine grained deposit of copper. This thin shell is stripped from the wax and soldered on a brass disk, then nickel plated to harden the surface. This is the "master" electrotype, from which another electroplate is made in a similar manner and called the "mother" record. This "mother" in turn is used to produce still another electrotype, known as the "matrix." It is from this matrix, after a most careful inspection, that the commercial hard rubber records are made in quantity production.

Thus it is seen that the record played in your parlor is the fifth in a series of reproductions from the artist's voice. The electrotypes are examined by expert engravers who remove any little burrs or other slight imperfections of the process. They are delicately polished on high speed spindles with soft rags and cleaning liquids. The electroplating art is really the most important step in the making of phonograph records.

*A complete description of the production of phonograph records was published in THE METAL INDUSTRY, January, April and June, 1918.

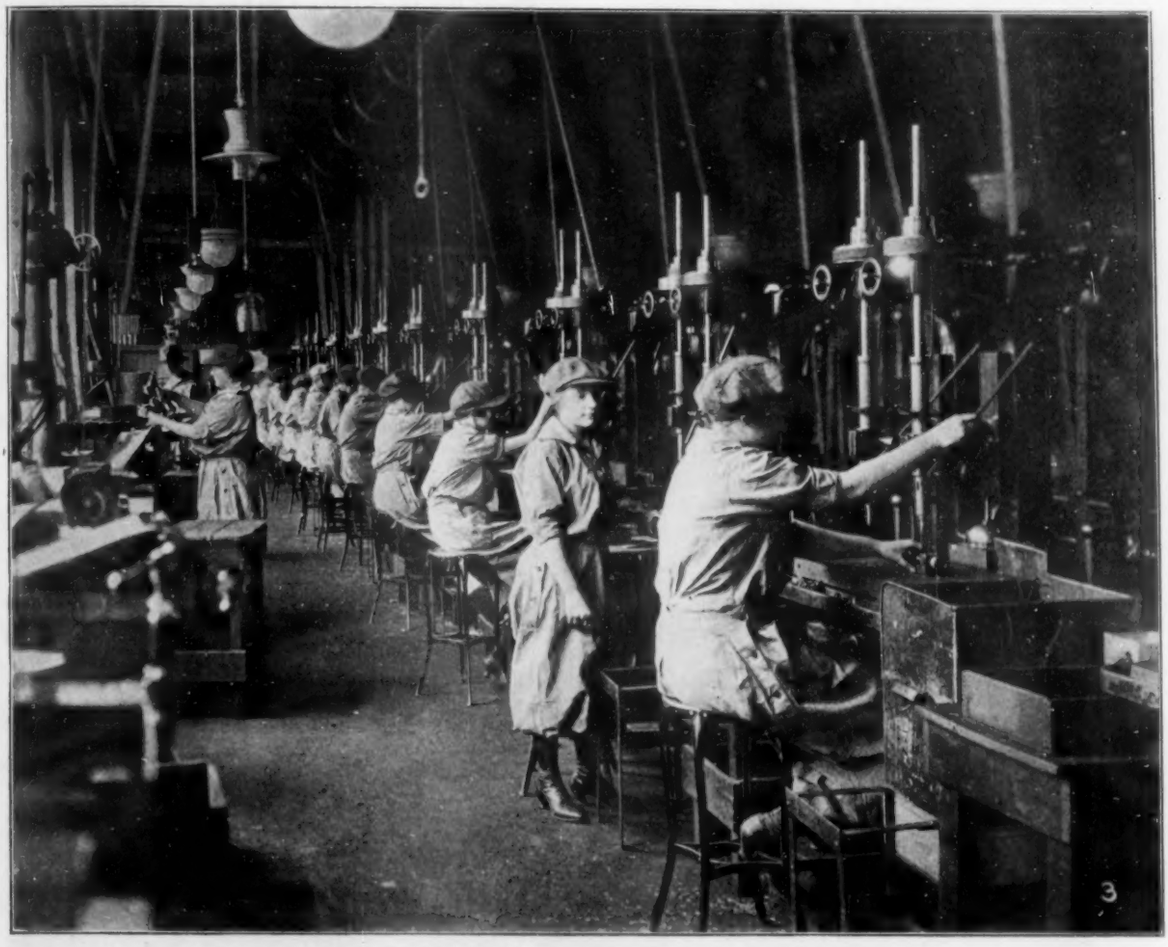
The Victor Talking Machine Company was incorporated in 1901 with an authorized capital stock of $5,000,000. Dividends have been paid regularly since incorporation to 1911 at the rate of 6 per cent per annum; from 1912 to October, 1914, 10 per cent per annum; 1915, 1916 and 1917, 20 per cent each; Jan. 15, 1918, 5 per cent; April 15, 1918, 5 per cent; extra dividends, 1912 and 1913, 10 per cent each, 1914, 25 per cent; March 15, June 15 and October 15, 1915, and Jan. 15, 1916, 10 per cent each; April 15 and October 14, 1916, 35 per cent each. It was reported that 15 per cent extra was paid Aug. 15, 1917, and 15 per cent extra Dec. 15, 1917. Victor stock, par value $100, recently sold for over $900 a share.

Officers of the company are Eldridge R. Johnson, president; Leon F. Douglas, chairman board of directors; Charles K. Haddon, vice-president and treasurer; and Ralph L. Freeman, secretary.

Very fine work is done at the Hartford Sterling Company plant at Twenty-fourth and Locust streets. Mr. A. B. Wells, the superintendent, has about 75 men in the various departments, but can use many more when at full capacity. Some sterling silverware is made, but the bulk of the work is silver or gold plate on a body of white metal of German silver. Platters, large table pieces, and spunware for liquid containers form the usual run of work. The Hartford Sterling business in Philadelphia was started 19 years ago, and has plating, polishing and lacquering rooms not excelled in the city.

In the same building with the Hartford Sterling plant is the A. H. & F. H. Lippincott Company, which formerly made soda water apparatus, requiring a certain amount of electro-plating work. They are now busy on parts for airplanes for the navy and are not using their plating rooms.

The George P. Pilling & Sons Company, makers of surgical instruments, have a five-story factory at Twenty-third and Arch streets. About one-fourth of the 250 employees are engaged in the electro-plating and polishing departments. The greater part of their work is nickel plated, but some silver and gold plating is also done. During the war this shop was exceedingly busy on surgical instruments for the government. Philadelphia has long been known as the center for surgical and medical education, and naturally has a big business in all kinds of surgical apparatus and instruments. Mr. S. Barr is in charge of the plating room.



MACHINE DEPARTMENT OF THE WELSBACH COMPANY, GLOUCESTER, N. Y.

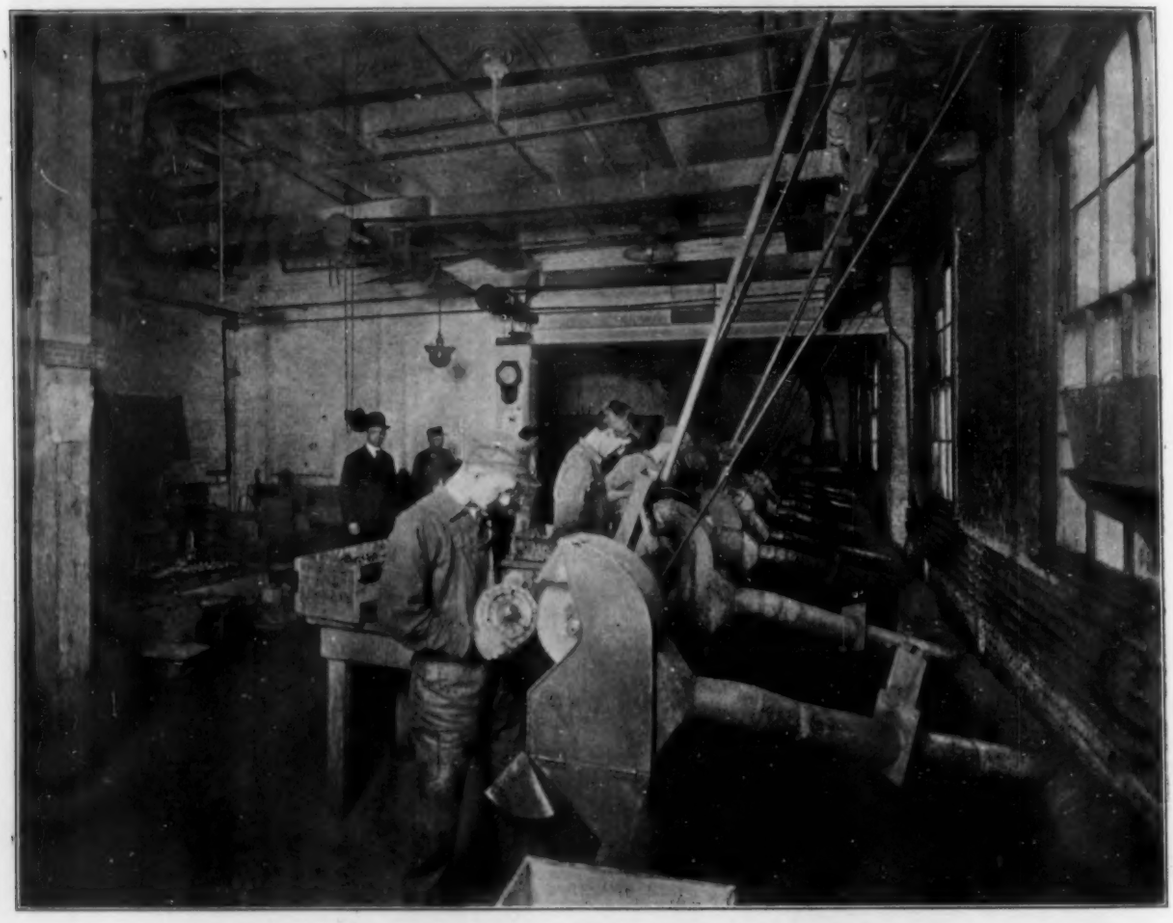
The De Long Hook and Eye Company at Broad and Wallace streets, plate tons of hairpins, hooks and eyes, press buttons and safety-pins every day. Mr. P. Gorling is foreman. The General Electric Company branch factory at Seventh and Willow streets have a small department for copper and zinc plating in connection with the manufacture of switches and small electric connections. W. C. Jenner is in charge of the plating room.

The Welsbach Company at Gloucester, N. J., just across the river from South Philadelphia, have thoroughly equipped plating, polishing, enameling and lacquering rooms. Their acid house for pickling and dipping all brass parts is one of the most modern and

best equipped in the neighborhood. About 60 men are employed. E. T. Homan, a member of the association, is foreman.

A partial list of other manufacturing plants using electro-plating in their work follows:

Keystone Screw Company, Seventeenth and Lehigh.
Penn Rivet Corporation, 1115 Cambria street.
Miller Lock Company, 4530 Tacony street.
Brown Instrument Company, Wayne and Windrim avenue.
J. W. Pepper & Co., musical instruments, Thirty-third and Walnut streets.
Remington and Sherman Company, safe manufacturers, 636 Richmond street.
International Chemical Company, Camden.



POLISHING DEPARTMENT OF THE WELSBACH COMPANY, GLOUCESTER, N. J.

Warren Webster & Company, plumbers supplies, Camden.
Wm. H. Horstman Company, regalias, Cherry and Fifth streets.
Bonita Manufacturing Company, novelties and specialties, Fifty-sixth and Columbia avenue.
Enterprise Manufacturing Company, hardware specialties, Third and Dauphin streets.
Robert M. Green and Sons, soda fountains, 1413 Vine street.

Among the jobbing electro-platers are:

Rossberg and Snyder, 217 North Tenth street.
Louis J. Meyer, 804 Walnut street.
Jaeger Automatic Machine Company, 2238 North Ninth street.
Howell-Melville Company, 1223 Spring street.
Globe Electro-plating Company, Ridge avenue and Noble street.
W. A. Atkins, 413 Cherry street.
Henry C. Betz, 51 North Tenth street.
Boudwin and Eisman, 706 Chestnut street.
R. E. Jackson, 705 Dauphin street.
Russell Meany, 234 Cherry street.
Midland Metal Company, Twenty-first and Jefferson streets.
Novelty Plating Company, 60 North Second street.
Pennsylvania Electro-plating Company, 812 Noble street.
Standard Plating Works, 446 North Twelfth street.
Leonard Schulze and Son, 104 North Sixth street.

A BIT OF HISTORY *

(Written to Commemorate the Tenth Anniversary.)

About the year 1890, Charles H. Proctor, then living in Ansonia, Conn., and in charge of the plating department of the Ansonia Brass and Copper Company, conceived the laudable plan of organizing foremen electro-platers into a society for the purpose of putting the industry of electro-plating upon a higher plane generally. His first public utterance upon the subject was in May, 1907, at the Second Regiment Armory, in Philadelphia, the occasion being the organization of The American Brass Founders' Association (now the American Institute of Metals). After reading his paper regarding electro-deposition of brass, Mr. Proctor suggested that an organization, national in scope, of platers be organized. Through the columns of THE METAL INDUSTRY Proctor appealed to platers to support him in his scheme. These appeals happily resulted in financial and moral support, and after several preliminary meetings at the

*From the official program.

old Astor House the organization meeting was held March 6, 1909 at the Hotel Chelsea in New York City. An organization known as the National Electro-Platers' Association of the United States and Canada was effected.

In June, 1909, just ten years ago, it was granted a charter by the State of New York. Branches were organized in rapid succession, the first being the Philadelphia Branch in 1910. In 1912 it was decided that each Branch should have equal rights, and at a convention held in New York City in February, 1913, the name of the organization was changed to The American Electro-Platers' Society of the United States and Canada. George B. Hogaboom was elected first supreme president. Seven national conventions have been held including the present. The society is strictly educational in its scope and has been recognized by the American Electro-Chemical Society, with which body a symposium was held in 1913 at Atlantic City, N. J., the subject for discussion being the art of electro-plating. The Bureau of Standards at Washington has also taken a deep interest in the work of the society with a view of standardizing formulas and methods.

Thus, after ten years, we meet in the municipality styled by William Penn, its founder, the "City of Brotherly Love." But one decade has passed since the birth of the society and branches are in vogue in nineteen cities with a total membership of 781. When we look back to the days prior to the realization of "Proctor's dream" and compare the pessimistic actions of platers with the frank and helpful attitude between the members of the society, we can better appreciate the glorious work of the A. E. S. And, it can be safely asserted, that the A. E. S. is still in its infancy! Its success is assured beyond cavil, but new fields will be conquered; the art of plating was never more appreciated than now. The future is certainly bright, and after listening to the speakers of the Seventh Annual Convention, it is certain that all who attend will return to their homes greatly benefitted by this convention.

ANNUAL CONVENTIONS WERE HELD AS FOLLOWS

First, New York City.....February 21-23, 1913
Second, Chicago .....June 4-6, 1914
Third, Dayton .....June 3-5, 1915
Fourth, Cleveland .....July 6-8, 1916
Fifth, St. Louis.....July 5-7, 1917
Sixth, Detroit .....July 1-3, 1918
Seventh, Philadelphia .....July 1-3, 1919

PLATING DEPARTMENT OF THE WELSBACH COMPANY, GLOUCESTER, N. J.

THE AMERICAN ELECTRO-PLATERS' SOCIETY ORGANIZED AS FOLLOWS

National Electro-Platers' Society of the United States and Canada organized in New York City, March, 1909:

First Branch .....Philadelphia, organized 1910
Second Branch ....Rochester, organized 1911
Third Branch .....Indianapolis, organized January, 1912
Fourth Branch ....Toronto, organized March, 1912
Fifth Branch .....Detroit, organized April, 1912
Sixth Branch .....Chicago, organized 1912
Seventh Branch ...Milwaukee, organized December, 1912
Eighth Branch ....St. Louis, organized December, 1912

Ninth Branch .....Dayton, organized March, 1913
Tenth Branch .....Newark, organized 1913
Eleventh Branch ..Buffalo, organized 1913
Twelfth Branch ...Cincinnati, organized 1913
Thirteenth Branch..Bridgeport, organized March, 1914
Fourteenth Branch.Cleveland, organized November, 1914
Fifteenth Branch...Toledo, organized Autumn, 1915
Sixteenth Branch ..Providence-Attleboro, organized March, 1916
Seventeenth Branch.Grand Rapids, organized March 18, 1918
Eighteenth Branch..Pittsburgh, organized March, 1919

BETSY ROSS HOUSE, PHILADELPHIA, PA.

THE MEMBERSHIP OF THE AMERICAN ELECTRO-PLATERS' SOCIETY IS DIVIDED AS FOLLOWS

The membership of the American Electro-Platers' Society is divided as follows:

Bridgeport Branch	50 members
Cleveland Branch	28 members
Chicago Branch	123 members
Cincinnati Branch	18 members
Dayton Branch	28 members
Detroit Branch	41 members
Grand Rapids Branch	21 members
Indianapolis Branch	21 members
Milwaukee Branch	23 members
New York Branch	88 members
Newark Branch	41 members
Philadelphia Branch	61 members
Pittsburgh Branch	17 members
Providence-Attleboro Branch	77 members
Rochester Branch	33 members
St. Louis Branch	42 members
Syracuse Branch	10 members
Toronto Branch	43 members
Toledo Branch	16 members
Total	781 members

GENERAL PROGRAM

(This program is definite, but a more detailed auxiliary program will be distributed when you register. This will contain the subjects for discussion and subjects of papers to be read, etc.)

JULY FIRST—MORNING

8:00 Registration of all members of the Society and guests in Green Room on Second Floor.
10:00 Convention called to order by National President, Walter Fraine, of Dayton, Ohio.
10:05 Address of Welcome by Hon. Thomas B. Smith, Mayor, or Mr. Edward James Cattell, City Statistician.

BELLEVUE STRATFORD HOTEL, PHILADELPHIA, PA., THE CONVENTION HEADQUARTERS.

The Acceptance of the "Keys of the City and Freedom of Philadelphia," by Mr. S. D. Benoliel of the Philadelphia Branch.
10:20 Address by Dr. Edgar Fahs Smith, Provost, University of Pennsylvania.
10:50 Introduction of members.
11:00 Address by Mr. Charles H. Proctor, "Father of the A. E. S." Subject, "How we can best adopt Standardization for Platers' Solutions in Individual Plants."

11:30 Address by H. J. Richards, of St. Louis, Editor "The Monthly Review."
12:30 Adjournment.

AFTERNOON

2:00 to 4:00 "Seeing Philadelphia" Tour No. 1. Take sightseeing cars at Hotel Bellevue-Stratford.

EVENING

8:00 Reading and discussion of papers.

JULY SECOND—MORNING

10:00 Convention called to order by President Fraine. Reading and discussion of papers.

AFTERNOON

2:00 to 6:00 Steamboat Ride on the Delaware. Take Steamer *Thomas Clyde*, foot of Arch Street Wharf. Refreshments. Music. Dancing.

EVENING

8:00 Reading and discussion of papers.

JULY THIRD—MORNING

10:00 Reading and discussion of papers.
Business Meeting.
Election of National officers.
Selection of next Convention city.

AFTERNOON

2:00 Visit to University of Pennsylvania, 34th and Woodland avenue, West Philadelphia.
2:30 Paper by Dr. Hiram S. Lukens, of the University of Pennsylvania. Subject, "On the determination of the wearing properties of electroplate by means of physical tests."
Papers will be read as follows:
"A report upon the Plans and Progress of the Plating Investigations at the Bureau of Standards," Dr. W. Blum.
"Factors Governing the Structure of Metal Deposits" (illustrated), Dr. W. Blum.
"Notes on Black Nickel Solutions," G. B. Hogaboom, T. S. Slattery and L. B. Ham.
"Fluoborate Lead Plating Solutions," F. J. Liscomb, E. Zalia Jencks and W. E. Bailey.
4:30 Inspection of the University grounds and buildings.

EVENING

7:00 Banquet. Music by Frueh's Orchestra. Vaudeville. Dancing. National hymns and topical songs.
12:00 Convention adjournment and "Good-Byes."

In charge of the Reception Committee, Messrs. Homan, Chairman; Kutz, Metz and O'Neil.

LADIES' PROGRAM

JULY FIRST—MORNING

9:00 Meeting in Green Room on second floor to get acquainted.
10:30 Automobile Tour No. 2.

AFTERNOON

2:00 to 4:00 The Automobile Ride "Seeing Philadelphia." See General Programme.

EVENING

8:00 Keith's Theatre.

JULY SECOND—MORNING

Meet at Hotel Bellevue-Stratford in the Green Room, Second Floor.
10:00 Visit and Inspection of the store of John Wanamaker.
11:00 Organ Recital, Grand Circuit Court, store of John Wanamaker.

AFTERNOON

2:00 to 6:00 Steamboat Ride on the Delaware. See General Program.

EVENING

10:00 Informal dance in Green Room. Music, Refreshments.

JULY THIRD—MORNING

Shopping tour among Philadelphia's leading department stores.

AFTERNOON

2:00 Automobile ride to Valley Forge on the Schuylkill River.

EVENING

7:00 The Banquet. See General Program.

The exhibition will be held in the Red Room, second floor, and in charge of the Exhibits Committee, W. P. Scott, Chairman, H. B. Farrand, G. G. Knecht, H. S. Henning.

LIST OF EXHIBITORS

J. B. Ford Company, Wyandotte, Mich. (Philadelphia Branch, 412 Bulletin Building, Philadelphia, Pa.).
Celluloid-Zapon Company, 200 Fifth avenue, New York City.
W. A. Fuller Company, Greensburg, Pa.
Walter C. Gold, 235 Race street, Philadelphia, Pa.
International Chemical Company, Camden, N. J.
Maas & Waldstein Company, 92 William street, New York City.
Metz Structural Company, Builders of Automatic Plating Machines and Supplies, Bridgeport, Pa.
THE METAL INDUSTRY, 99 John street, New York City.
The Norton Co., Worcester, Mass.
Nivin Mfg. Company, 1328 Broadway, New York City.
Oakley Chemical Company, 22 Thames street, New York City.
Galvanizing Corporation of America, 244 Eagle street, Brooklyn, New York City.
Rossler & Hasslacher Chemical Company, Fifth and Chestnut streets, Philadelphia, Pa.

CONVENTION REGULATIONS

The convention registration fee is $5 per person, payable at the registration desk in the Green Room, second floor, between 8 and 10 a. m., July 1. At the time you register an envelope will be handed you containing tickets for automobile ride July 1; steamboat ride July 2, auxiliary program of the convention, badge and any other data which may be needful to your enjoyment and pleasure while with us.

S. P. GARTLAND,
National 1st Vice-President.

MARTIN J. SMITH,
Chairman of Badges and Printing.

The convention will be held in the Clover Room, second floor. The exhibits will be found in the Red Room, second floor.

The managers of the Bellevue-Stratford, the convention hotel, announce the following accommodations:

Single room—without bath—$3 per day.
Single room—with bath—$4 per day.
Double room—without bath—$4 per day.
Double room—with bath (double bed)—$5 per day.
Double room—with bath (two single beds)—$6 per day.

The above are inside rooms, opening on a large, airy court, and are very comfortable.

Outside single room—with bath—$5 per day and up.
Outside double room—with bath (twin beds)—$7 per day and up, according to size and location.

PROGRESS IN METAL CASTING IN ENGLAND

A "Feeder-head" Method for Producing Sound Bars

By W. R. Barcay.

Almost throughout the history of steel making, whether by crucible or open-hearth processes, the subject of the production of sound ingot castings has been one of continuous interest and investigation on the part of both practical and scientific workers. In this direction the iron and steel industries have to their credit a very considerable mass of technical literature of greater or lesser value. It is somewhat anomalous, therefore, that the subject of ingot casting in the metal industries has received so inadequate attention as appears to be the case when information is sought for either in technical literature or in works practice. A few sparse references to the subject are to be found in text books and technical journals if assiduously searched for, but these bear no comparison to the detailed and systematic records of patient investigation in the sister-subject of steel casting.

One fairly obvious reason for this anomaly is that the production of absolutely sound ingots is of relatively greater importance in steel than in metal casting, not only because of a vastly greater output, but for the more vital reason of the necessity of steel to resist stresses and strains in great engineering and constructional enterprises. It is only occasionally that life and limb are involved in the question of the internal soundness of a brass or copper ingot, whereas somewhere, at every moment, in these modern days, human life and safety are dependent on sound steel.

A secondary reason also is that in general, owing *inter alia* to the lower melting points of the principal metals and alloys, fewer difficulties present themselves to the ingot caster than is the case with the steel alloys. No serious student of the metal trades of this country can, however, have failed to realize that a great deal of time and money, to say nothing of irritation, could be saved if the standards of quality in this particular direction could be raised at least to a point more in accord with the highest standards in steel practice.

The object of the present article is to draw a comparison between the general methods adopted in crucible steel ingot casting on the one hand and crucible metal ingot casting on the other, and to make some suggestions as to the adoption in the latter of methods of proved value in the former.

In the first place, however, it will be advisable to consider briefly some general principles of ingot casting. When molten metal is poured into a box mould (square or rectangular) solidification begins almost immediately the liquid touches the inner walls of the mould, and simultaneously the mass shrinks in volume, the direction of such shrinkage being, of course, towards the sides of the ingot and away from the centre. This shrinkage, as every caster well knows, is very considerable, and must be provided for by what is technically termed "feeding" the ingot, *i. e.*, after the mould is apparently full continuing a steady stream so long as the metal appears to sink. If "feeding" is not carried out the resulting ingot will have a hollow cavity, technically known as a "pipe," running through the centre almost from the bottom to the top, and is, consequently, nearly useless for rolling or drawing. It should further be noted that the degree of shrinkage is dependent on the temperature at which the metal is poured, molten metal, like other liquids, being governed by the general laws of expansion and contraction, according to temperature. At whatever temperature in the liquidus range metal is poured "piping" must occur, and, unfortunately, even the most efficient methods of "feeding" do not entirely eliminate it. It is this factor which gives rise to the greatest difficulties in the way of the production of absolutely sound ingots, though it must be borne in mind that other troubles, *e. g.*, slag, oxide or gas occlusions, are also constantly experienced. These also, however, are, to some extent, influenced by the methods adopted in "feeding" the ingot, as will be clear from what follows.

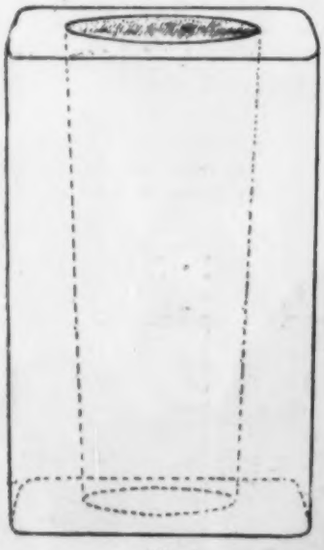


FIG. 1.

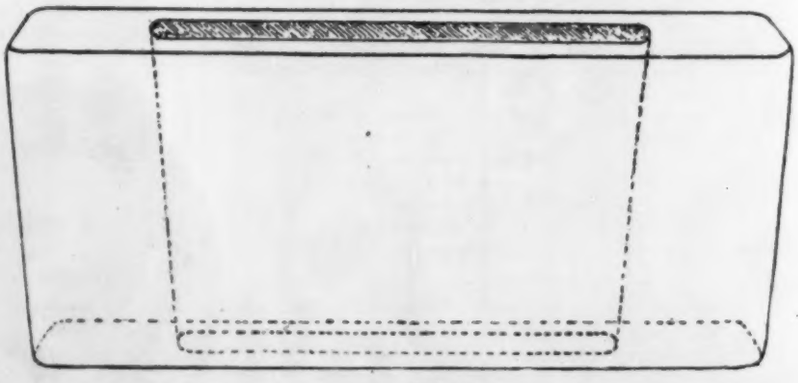


FIG. 2.

FORM OF "DOZZLES" OR FEEDERS FOR SQUARE AND RECTANGULAR MOLDS.

One of the main results of the fuller research which has been carried out in the steel industry has been to emphasize the vital importance of this question of "feeding" cast ingots, and of taking advantage of any method which will render this process more efficient. To this is due the introduction and general use of what is termed the "feeder-head." In crucible steel ingot casting in square or rectangular moulds this takes the form of the fireclay "dozzle," illustrated in Figs. I and II. These "dozzles," previously made white-hot, are inserted at the top of the ingot mould immediately the teemer has filled the mould. The metal required for feeding is then poured inside the dozzle, and as the centre of the ingot sinks this metal is drawn upon to feed the cavity. The

hot dozzle is, therefore, a kind of sleeve or secondary crucible holding the metal in the liquid state at least sufficiently long to allow it to be drawn into the interior of the ingot as required by the shrinkage cavity.

It will be instructive now to compare the actual technique of the casting process itself as usually carried out by steel and metal casters respectively.

In Fig. III. is given an illustration of the crucible steel ingot caster at work.

Fig. IV. illustrates the brass ingot caster at work.

An examination of these illustrations reveals two very important differences:

(*a*) In Fig. III. the caster, standing at the side of

FIG. 3—POURING A STEEL INGOT.

the ingot mould, and balancing his pot on his knee, is able to direct the stream of molten metal into the centre of the mould, and also afford every opportunity for an assistant to adjust a "feeder-head" or dozzle when the mould is filled and the ingot ready for "feeding." In Fig. IV., on the other hand, the metal is poured by tilting the crucible on the edge of the mouth of the ingot mould, thus rendering it impossible to pour without "catching" the sides of the mould, and interposing very serious difficulty to the adoption of any "feeder-head" or mechanical method of feeding.

(*b*) It is important, further, to note the relative position of the ingot mould in Figs. III and IV. respectively. In the former it is almost exactly vertical; in the latter it is necessarily appreciably inclined from the vertical, and in a considerable number of casting shops at an angle of less than 45 deg. from the horizontal.

Now it must surely be clear to any worker familiar with the way in which liquid metal shrinks and solidifies in cooling that the method illustrated in Fig. III. is much more likely to produce sound casting than that in Fig. IV., even if no other factors were introduced.

Both theoretical and practical considerations would emphasize the necessity of:—

(1) Filling an ingot mould by a steady and continuous flow of metal rising at a regular rate from the bottom of the mould.

(2) Directing the stream of liquid as near as possible to the centre of the mould, above all avoiding the interruption of the flow by intermittent catching of the inner walls of the mould by the liquid.

Both these considerations are much more likely to be fulfilled in the former case than in the latter.

But it is when one comes to the final operation of feeding the ingot that the contrast between steel and metal methods become indefinitely pronounced.

In the case of the crucible steel ingot, the moment the liquid metal has reached the top of the mould, and the teemer observe incipient shrinking, an assistant intro duces the square or rectangular fireclay "feeder-head" shown in Figs. I and II. This "dozzle" is made white hot, and quickly and skilfully inserted at the mouth of the ingot-mould just as the metal inside begins to shrink. The caster then directs his "feeding" stream inside the dozzle until the latter is completely filled, and the operation is thereafter the purely automatic drawing of the dozzle metal into the interior pipe of the ingot.

On the other hand, the metal caster usually stops pouring altogether when the liquid metal reaches the top of the mould, waits a few seconds to observe the sinking which indicates the shrinkage of the solidifying metal, and then begins to feed by teeming at a very slow rate, often in a series of intermittent "jerks," until the ingot has taken up all the metal it apparently will. The length of time thus occupied is usually at least two or three times that taken by the pouring operation proper.

Now it will be clear that the degree of success of this feeding operation is entirely dependent on the skill of the operator, and on the temperature of the metal left in the crucible for the purpose. Should the caster's judg-

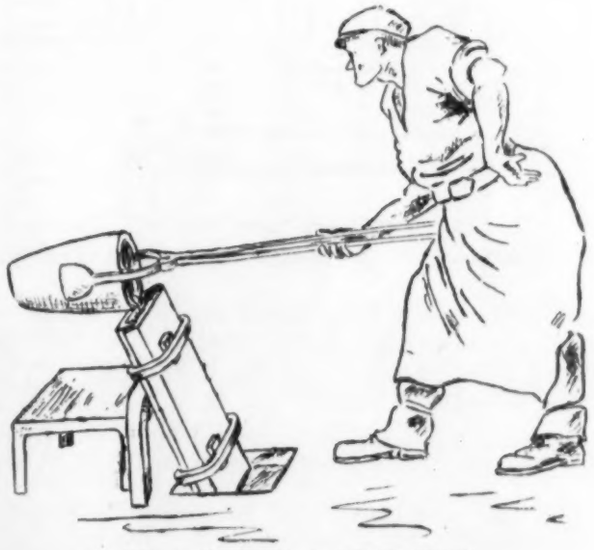


FIG. 4—POURING A BRASS INGOT.

ment be at fault, and the feeding operation started before the mold is properly filled the upper part of the ingot is useless. If, again, he is not able to keep the flow of metal under perfect control, it will pass into the pipe cavity in disconnected particles, rendering the occlusion of gas, oxides, or slag almost certain, but the greatest risk of all is that before the feeding operation is complete the temperature of the metal has fallen almost to freezing point, and it is actually solidified when it comes into contact with the cooler metal inside the mould. The result of this is that while the upper portion of the ingot is apparently sound, the lower part has an unfed "pipe" cavity of considerable extent. If, further, as is often the

case, two or even three ingots are to be cast from one crucible, the caster is invariably tempted to leave the one incompletely fed in order to pour the other one or two before the temperature of his metal appreciably falls.

The following description of a "dozzle" method of feeding non-ferrous ingots is given with the hope of assisting practical workers, and also of arousing further interest in systematic investigations of the whole subject. The method was introduced by the writer into one or two brass foundries in Birmingham, not only with the object of securing a greater degree of soundness in the ingot itself, but of reducing the amount of scrap made in what are known as "gate ends," *i.e.* the extent to which the ingot must be cut down to get rid of the upper pipe cavity. Both these objects were attained in a very satisfactory degree.

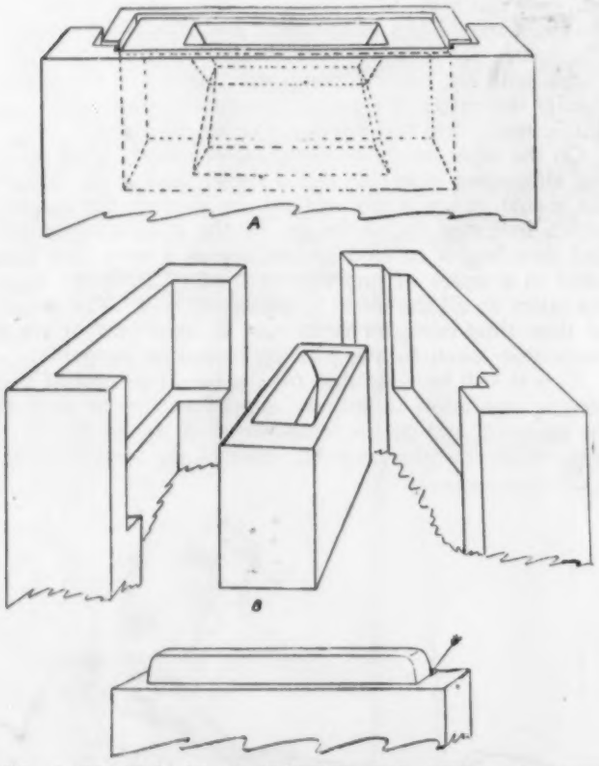


FIG. 5—DETAILS OF A "DOZZLE" FOR METAL CASTINGS.

The general principle of the method will be understood on examination of the outline sketches in Fig V., A and B.

The ingot mould used is of the ordinary rectangular type, opening either at center or side. The upper part of the mold is recessed, as shown in Fig. V, B, in order to allow for the insertion of a fireclay dozzle. The general outline of the dozzle is rectangular, but it will be observed that the inner core is shaped into a funnel tapering inwards for a short distance, then outward to the bottom of the dozzle (see Fig. V, A). The depth of the recess in the mold itself is just sufficient to allow the dozzle when inserted to lie flush with the upper edge of the mold, so that no alteration in the usual manner of eteming is necessitated.

The actual procedure of casting thus varies little from the normal except that the mold must be placed as near as possible in a vertical position. The dozzle is not inserted until the crucible, with its molten contents skimmed, has been placed in position for pouring. It is then, after previously been made white hot, deftly inserted into the prepared recess of the mold.

The caster then directs the stream of metal through the dozzle. The latter acts as a funnel, and guides the liquid towards the center of the mold. Incidentally, this largely prevents those very common troubes known as "cold-tap," etc., which are often due to the liquid metal catching the inner walls of the mold, and disturbing the dressing. The teeming proceeds at one regular rate, until not only the mold, but the dozzle, is completely filled. The casting operation is then finished, no feeding being necessary. If properly proportioned the capacity of the dozzle should be sufficient to completely feed the ingot pipe and leave a small margin as "gate-end," which, as indicated by arrow in Fig V, C, can readiy be cut off The general arrangement is shown in Fig. VI.

All who have studied the structure of ingots will agree as to the importance of the factors of "temperature" and rate of teeming." It is obvious that in a long ingot neither of these factors can be constant. The structure of the upper portion of the ingot is, consequently, altogether different from that of the lower, and the center core again provides a contrast to both.

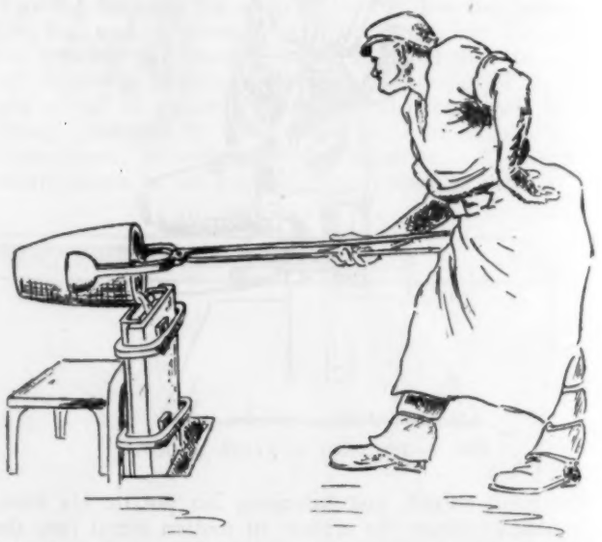


FIG. 6—PROPER ANGLE FOR MOLD WITH "DOZZLE" IN PLACE.

The simple experiment of cutting a transverse section of an ingot through the top and bottom respectively, polishing and etching it, and then examining the structure by means of a hand lens will furnish very interesting evidence on this point.

Now, while it is impossible to imagine any practical method of ingot casting wherein these two factors are entirely uniform, it can readily be imagined that by the method just described the wide divergencies of conventional ingot casting are considerably reduced, and the whole operation placed on a more scientific basis.

Emphasis must, however, be laid on the necessity for close attention to the ordinary details making for success in ingot casting, such, *e. g.*, as (*a*) temperature of mold, (*b*) careful dressing, particularly avoiding excess of oil or resin, (*c*) position of molding in teeming, *i. e.*, to place vertically, (*d*) finally the dozzle itself must be as hot as possible. The purpose of the dozzle is to retain in the liquid state the metal which it surrounds until practically the whole content has been drawn upon to feed the pipe. The necessity for heating to a considerable temperature is, therefore, obvious.

METAL PLATING

A Compilation of Tables Showing the Time Required to Deposit a Given Thickness of Metal.

(Written for The Metal Industry by W. G. Knox, Associated With the Chemical Laboratory of the Western Electric Company, Inc.)

There are to be found in many of the scientific technical works of early authors and also in modern text books, methods and formulae designed to facilitate one in making computations for plating electrolytically the various metals. Some authors have reduced the methods to a very few simple calculations, but even with these facilities, which by the way may not, at a much needed time, be available, one may make considerable error. It is rather peculiar that with all the data to be found on the subject of depositing of metals, no one has taken the trouble to prepare and publish complete tables showing the time necessary to deposit a given thickness and the corresponding weight of metal for that thickness. Usually all that is to be found is a brief reference to the methods of how the calculation is carried out, accompanied by one or two examples, leaving for the reader the necessity of making computations to suit his individual requirements. It is not intended, in the following tables, to cover in minute detail the field for the time, the weight of an infinite number of thicknesses of the various metals, but to cover the field broadly enough to include the minimum and maximum plate usually desired. It is believed that the current densities and the thicknesses shown are broad enough to include those of practical value.

The metals for which tables have been calculated are: copper, zinc, nickel, iron, cobalt, tin, cadmium, antimony, lead, gold and silver. For copper and gold, two tables for each were made for the reason that these two metals occur in solutions having more than one valence. Very erroneous results would be obtained should wrong values be selected for computing the weight of a deposit. Several of the metals given have more than one valence, but only in the case of the copper and gold have additional tables been prepared, the rest being deposited as indicated by the tables.

In order to understand the controlling factors of the deposition of the metals, it is necessary to know how the values have been formulated.

Faraday, years ago, derived certain values which today form the basis of practically all electro-chemical work. Briefly stated, his observations were: "The amount of deposit is proportional to the current, to the time and to its chemical equivalent." Chemical equivalents are the amounts of the elements which will replace or combine with a unit weight of hydrogen. It is necessary therefore to know this important factor before definite values for the deposition of a metal can be given. Further, the rate of deposition of a metal depends on the valence and the atomic weight. In all cases the atomic weight remains constant, whereas the valence may vary. For example, the atomic weight of gold is 197.20, but the valence may be one or three.

In establishing the values for the electro-chemical equivalents, silver was selected because of certain advantages which it possesses. The electrolyte usually employed is the nitrate, being represented chemically by the formula $AgNO_3$. Silver is monovalent and is commonly used as the basis on which the electro-chemical equivalents of the other metals are derived.

The amount of silver deposited by the passage of an electric current of one ampere for a period of one second has been accurately determined to be 0.00111800 grams. This figure divided into 107.88, the internationally accepted value for the atomic weight of silver, gives a product of approximately 96500 coulombs. The coulomb being a unit of electric quantity, 96500 is therefore the commonly accepted standard and is called a Faraday.

Now the chemical equivalent of an element in the divalent form is just one-half that of the same element in the monovalent form. This being true, it is only necessary to know the valence and the atomic weight to proceed with the derivation of the electro-chemical equivalent of another element. Take, for example, copper, with a valence of one or two. The atomic weight of copper is approximately 63.6. The chemical equivalent of the monovalent form is 63.6 and of the divalent 31.8. If each of these figures be divided by 96500, it will be found that the quotients are respectively 0.000659 and 0.000329. These figures represent the amount of copper in grams for a valence of 1 and 2, deposited by the passage of a current of one ampere for a period of one second.

The following is a list of the metals for which deposition values have been calculated. For convenience, the atomic weight, specific gravity, valence, electro-chemical equivalent, and grams per ampere hour are shown:

Element.	Specific Gravity.	Atomic Weight Oxygen = 16.	Valence.	Electro-chem. Equiv. Grams Per Amp.-sec.	Grams Dep. Per Ampere-hour.
1. Copper (ic)	8.90	63.57	2	.000329	1.186
2. Copper (ous) ...	8.90	63.57	1	.000659	2.372
3. Zinc	6.90	65.37	2	.000339	1.220
4. Nickel	8.8	58.68	2	.000304	1.095
5. Cobalt	8.72	58.97	2	.000305	1.100
6. Iron	7.80	55.84	2	.000289	1.042
7. Tin	7.3	118.7	2	.000615	2.214
8. Cadmium	8.60	112.4	2	.000582	2.097
9. Antimony	6.7	120.2	3	.000415	1.495
10. Lead	11.4	207.2	2	.00107	3.865
11. Gold (ic)	19.3	197.2	3	.000681	2.452
12. Gold (ous)	19.3	197.2	1	.00204	7.357
13. Silver	10 5	107.88	1	.001118	4.025

They form therefore the basis of all the calculations shown in the tables.

The method of calculation was as follows: First the weight of metal per square inch was determined for a definite thickness. From this the calculation for the time to deposit that weight of metal was determined. These figures being established, it was only necessary to carefully compute the time for any desired thickness at a definite current density. The figures for the time to deposit a given metal for a given thickness are therefore theoretical and represent the maximum amount of a metal which it is possible to deposit. The values are never strictly realized in the commercial field.

For actual plating it would probably be better to assume a cathode efficiency of ninety per cent (90%), which will more correctly represent the deposit obtained. It will therefore be necessary to add 10% to the figures for time shown on the tables for commercial practice. It is to be understood that with all tables the time given refers to average deposits.

The thickness of deposit of the metals, with one exception (lead), has been given from 0.00001″ to 0.002″ inclusive. Lead is shown with a minimum thickness of 0.0001″ and a maximum of 0.020″.

The current density is given both in square feet and square inches. This method was adopted in order to

take care of laboratory experiments as well as for work in the shop. The time has been expressed in hours, minutes, and seconds. Such a division was made necessary by the short time required to deposit the very thin plates, especially at the higher current densities. The division of time into minutes and seconds was followed to and including eleven minutes above which the seconds, if appreciable, were added on as another minute. A heavy line was drawn through each table showing where the division of time given in minutes and seconds was separated from the time given in hours and minutes.

The current densities shown in the tables, expressed on the basis of amperes per square foot, are probably ample to take care of work carried normally out in the average plating establishment, being given with a minimum of one ampere per square foot, then divisions of one to ten; from ten the steps are in increments of 5 amperes.

The highest current density given is fifty. It was felt that very little practical work is being done above that figure. Gold and silver are given in divisions of one-half ampere per square foot, with an initial current den-

Current Density

Amps. Per Sq. Foot	Amps. Per Sq. Inch	.00001	.00002	.00003	.00004	.00005	.00006	.00007	.00008	.00009
1	.007	:11 16	:23	:34	:45	:57	1:08	1:19	1:30	1:42
2	.014	:05 38	:11	:17	:23	:29	:34	:40	:45	:51
3	.021	:03 21	:07 30	:11	:14	:19	:23	:27	:31	:34
4	.028	:02 42	:05 38	:08 27	:11	:14	:17	:20	:23	:26
5	:.035	:02 15	:04 30	:06 45	:09	:11	:14	:16	:18	:20
6	.042	:01 53	:03 46	:05 39	:07 32	:09 25	:11	:13	:15	:17
7	.049	:01 35	:03 10	:04 45	:06 20	:07 55	:09 30	:11	:13	:15
8	.056	:01 25	:02 50	:04 15	:05 40	:07 05	:08 30	:09 55	:11	:13
9	.063	:01 14	:02 28	:03 42	:04 56	:06 10	:07 24	:08 38	:09 52	:11
10	.070	:01 08	:02 16	:03 24	:04 32	.05 40	:06 48	:07 56	:09 04	:10 12
15	.105	:00 41	:01 21	:02 02	:02 43	:03 24	:04 06	:04 47	.05 28	:06 09
20	.140	:00 34	:01 08	:01 42	:02 16	:02 50	:03 24	:03 58	:04 32	:05 06
25	.175	:00 22	:00 54	:01 21	:01 48	:02 15	:02 42	:03 09	:03 36	:04 03
30	.210	:00 23	:00 46	:01 09	:01 32	:01 55	:02 18	:02 41	:03 04	:03 27
35	.245	:00 19	:00 38	:00 57	:01 16	:01 35	:01 54	:02 13	:02 32	:02 51
40	.280	:00 17	:00 34	:00 51	:01 08	:01 25	:01 42	:01 59	:02 16	:02 33
45	.315	:00 15	:00 30	:00 45	:01	:01 15	:01 30	:01 45	:02	:01 15
50	.350	:00 14	:00 27	:00 41	:00 55	:01 09	:01 23	:01 37	:01 50	:02 03
Grams Per Square Inch		.00143	.00286	.00429	.00572	.0072	.0086	.0100	.0114	.0129

TABLE SHOWING TIME REQUIRED FOR A THICKNESS
Calculated on the Basis of 100% Cathode

*Nickel and Cobalt being quite comparable as to electro-chemical equivalents, this table may be used for either.

sity of .5, the maximum being 9 amperes per square foot. The thickness of all deposits is ample to cover the average requirements of laboratory or shop.

In order that proper interpretation of the figures may be made, a few examples are here shown: :00^{51} is read fifty-one seconds; :05^{29} is five minutes and twenty-nine seconds; :10^{36} is ten minutes and thirty-six seconds; 7:48 is seven hours and forty-eight minutes, etc. Suppose it is desired to deposit a coating of zinc 0.0001″ thick and the current density to be used is 15 amperes per square foot. Calculate approximately the area of the part to be finished; if it amounts to five square feet, multiply 5 x 15, which is 75 amperes. Therefore, 75 amperes passing for a period of 9 minutes will be theoretically correct, but since the efficiency of deposition is not 100%, it will be necessary to add 10% as previously explained. The final time therefore will be about ten minutes. Further, the weight for the thickness is also available. At the foot of the column for a thickness of 0.0001″ will be found the weight in grams per square inch which is 0.0113 or for a square foot 12 x 12 x 0.0113 = 1.62 grams.

The advantage of these tables is that they may be easily interpreted by the practical plater as well as by the laboratory worker. To the former they should be especially helpful and to the latter less calculations.

.0001	.0002	.0003	.0004	.0005	.0006	.0007	.0008	.0009	.001	.002
1:53	3:46	5:38	7:31	9:23	11:16	13:09	15:02	16:54	18:46	37:33
:57	1:53	2:49	3:46	4:42	5:38	6:35	7:31	8:27	9:23	18:46
:38	1:15	1:52	2:30	3:08	3:46	4:24	5:02	5:39	6:15	12:30
:28	:56	1:24	1:52	2:20	2:48	3:16	3:44	4:12	4:42	9:24
:23	:45	1:08	1:31	1:54	2:17	2:40	3:03	3:26	3:48	7:36
:19	:38	:57	1:16	1:35	1:54	2:13	2:32	2:51	3:09	6:18
:16	:32	:48	1:04	1:20	1:36	1:54	2:08	2:24	2:40	5:20
:14	:28	:42	:56	1:10	1:24	1:38	1:52	2:06	2:20	4:40
:13	:25	:38	:51	1:04	1:16	1:28	1:40	1:52	2:04	4:08
:11	:23	:34	:46	:58	1:08	1:20	1:31	1:42	1:53	3:46
:06^{50}	:13	:20	:27	:34	:41	:48	:55	1:02	1:09	2:18
:05^{40}	:12	:18	:23	:29	:35	:41	:47	:53	:59	1:58
:04^{30}	:09	:14	:18	:23	:28	:33	:38	.43	:48	1:36
:03^{50}	:07^{40}	:12	:16	:20	:24	:28	:32	:36	:40	1:20
:03^{10}	:06^{20}	:09^{30}	:13	:16	:19	:22	:25	:28	:31	1:02
:02^{50}	:05^{40}	:08^{30}	:11	:14	:17	:20	:23	:26	:29	:58
:02^{30}	:05	:07^{30}	:10	:13	:15	:18	:20	:23	:25	:50
:02^{15}	:04^{30}	:06^{45}	:09	:12	:14	:16	:18	:20	:23	:46
.0143	.0286	.0429	.0572	.0715	.0858	.1001	.1144	.1287	.1430	.2860

OF DEPOSIT IN INCHES OF NICKEL-COBALT*

Efficiency Hours, Minutes and Seconds.

Note—Time below 11 minutes given in minutes and seconds; 11 minutes and above given in hours and minutes.

UP TO DATE TOOLS FOR MACHINING BRASS PARTS ON TURRET LATHES AND SCREW MACHINES

SOME INFORMATION OF VALUE TO THE FINISHER.

WRITTEN FOR THE METAL INDUSTRY BY P. W. BLAIR, MECHANICAL EDITOR.

Turret lathes and screw machines are efficient only when efficiently tooled. By adopting tools that permit heavier cuts or more cuts at the same time the turret lathe or screw machine is made more efficient and the mechanics' work less wearing. The adoption of plain, rigid and adjustable tools for machining the outside and inside diameters of brass goods not only speeds up production but also improves the quality of the articles. Fig. 1 shows a plain tool, one hole is provided for the cutting tool for the outside and the center hole is bored for holding tools such as drills, reamers, counterbores and pilots and can be accommodated with a blade for facing.

Fig. 2 shows a slide tool, having two holes for holding cutters. This not only increases the range of the tool but also permits of the use of two cutters for double facing cuts. The two adjustable stops and dial are valuable features on a tool of this type for by their use cutters can be quickly and accurately adjusted to size. The cutting of screw threads is an important item in all manufacturing operations, especially for the small diameter sizes with fine pitch threads.

Fig. 3 illustrates the acorn die and holder, which,

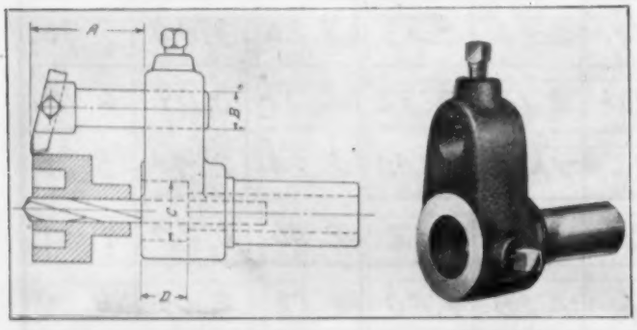


FIG. 1—A PLAIN INSIDE AND OUTSIDE TOOL.

owing to its various holders, is adapted to all kinds of machines, lathes, drill presses, hand or automatic screw machines and turret lathes. The adjusting cap is bevelled on the inside to fit the corresponding bevel on the prongs of the die, and by turning this threaded cap the correct adjustment is instantly obtained, all the prongs converging equally toward the center. When the correct adjustment is made the cap is held in position by the lock nut back of it. The die is held in perfect alignment with the shank and this means that when once a machine is set, a die may be removed for sharpening, a new one set in its place, and the machine is ready for threading exactly to the same length.

This die with the releasing holder will thread a given length and then automatically release and revolve with the work. Such a feature is indispensable when it is necessary to govern the length of the thread cut. In hand screw machines or turret lathes where the reversal of the machine is dependent upon the operator a releasing holder is a necessity to avoid stripping the threads when running to a shoulder and also avoids injury of the dies. So by the use of the releasing attachment the die merely spins in its holder with the work until such time as the operator reverses it. A tendency towards carelessness in expression and custom has resulted in restricting many terms and unduly broadening others. The interchangeability of many terms is not thoroughly understood, for instance, to describe an operation, machinists and brass workers use different expressions than the drafting room. After making an extended inquiry into these terms I believe the following definitions can be said to correctly cover the scope of each expression. However, there may be finer points involved in these suggestive expressions.

DEFINITIONS OF VARIOUS MECHANICAL TERMS.

ALLOWANCE.—British term for variation in dimensions to allow for different qualities of fit.

ANGLE DIAMETER.—Same as pitch diameter.

ANGLE OF THREAD.—The total or included angle be-

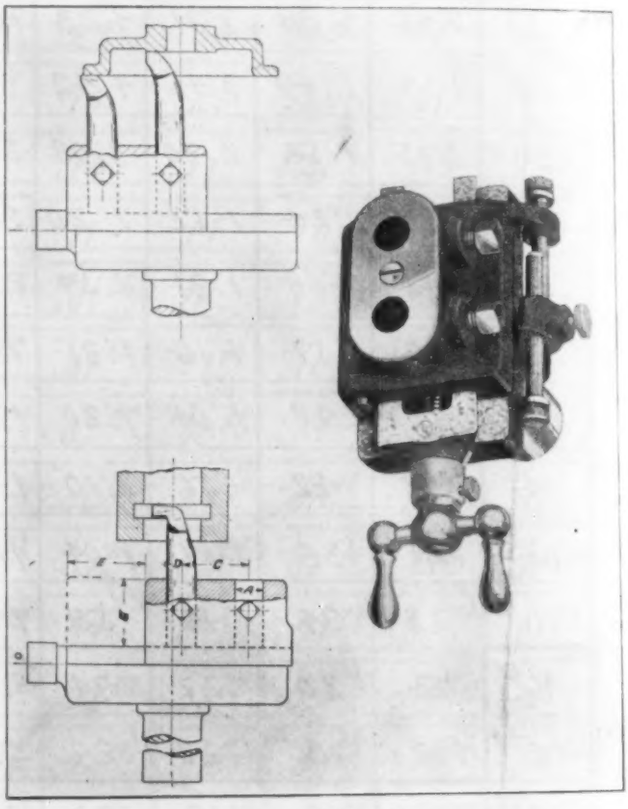


FIG. 2—A SLIDE TOOL.

tween the side or walls of a thread measured on the axial line.

CHAMFER.—The clearance allowed on the end of a threaded piece or the taper on the point of a tap made by cutting away the tops of the threads.

CLEARANCE ANGULAR.—Allowance on the angles of the thread for screw threads to fit together.

CLEARANCE BOTTOM.—Allowance or space at bottom of threads to prevent a bearing except on angles of thread.

CLEARANCE TOP.—Allowance at the apex of a screw thread in order to clear bottom of mating thread.

DIAMETER, EXTERNAL.—The outside measurement over the top of the thread of a tap or screw.

DIAMETER, ROOT.—Diameter at the bottom or root of thread. The smallest diameter of a screw or tap.

Since gauges of all descriptions have come into practical use in the last few years a definition of the terms, names and use of same as they are specified on the work-

ing drawings are as follows:—

FIT, FINGER.—Where the screw fits the threaded part of gauge so that it can be screwed into the threaded hole with fingers.

FIT, WRENCH.—Where it requires a wrench to drive the screw into place.

GAUGE, LIMIT.—A gauge having two sizes, the difference between them representing the tolerance or allowable variations. One size must go into or over the work, while the other must not, and should be called a tolerance gauge unless the limits are marked on the gauge.

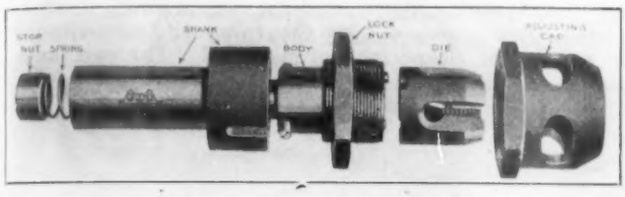


FIG. 3—AN ACORN DIE.

MASTER GAUGE.—The standard gauge which is kept solely for comparing reference gauges. All manufacturers of plumber's brass goods should have a set of iron pipe sizes of Master Gauges, male and female, so that all sizes can be tested up periodically.

GAUGE PLUG (screw or plain).—A gauge having a threaded end or plug of specified diameter and pitch for testing threaded holes or straight bores.

LIMIT OR TOLERANCE.—A maximum or minimum dimension slightly above or below a standard size, or a total variation allowed or tolerated between minimum or maximum limits.

PITCH.—The distance between two threads (from center to center). Correctly expressed in fractions as ½ inch but more commonly known as 12 threads per inch.

RELIEF.—Clearance allowed back of the cutting edge to reduce friction, whether on the top, bottom or wall of thread.

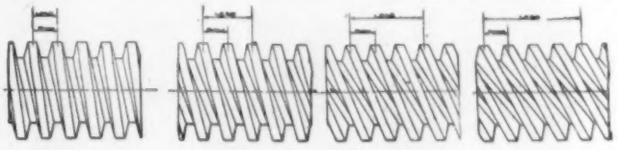
THREADS PER INCH.—The number of threads per inch of linear measurements as measured with a pitch gauge. The reciprocal of the pitch.

THREAD, SINGLE.—A thread in which the lead is equal to the pitch.

THREAD, DOUBLE.—A thread in which the lead is equal to two times the pitch.

THREAD, TRIPLE.—A thread in which the lead is equal to three times the pitch.

Fig. 4 illustrates single, double, triple and quadruple threads. The question is sometimes brought up or drawings specify sharp V thread. Great caution should be used in adopting a V thread as it is not standard, never was and never will be. It is impossible to produce such a thread. This will be found true when it is considered that the razor-like apex of a theoretical V thread (supposing of course that it is possible to make such a thread) would break or wear off at the first use and the screw would lose its size immediately.



Single. Double. Triple. Quadruple.

VARIOUS FORMS OF THREADS.

Because of this fact various manufacturers have, from time to time, adopted certain modifications of the theoretical V thread (allowing a flat at both top and bottom of thread) which seems to meet their requirements. Fig. 5 illustrates a sharp V thread, the United States standard thread and also the Whitworth standard thread.

The United States standard thread used by the army and navy departments as well as by the majority of the manufacturers and on the great railway systems of the country is the standard on the American continent the same as the Whitworth thread is the standard for Great Britain, due to the fact that it has a uniform diameter, pitch, angle of thread, wall and is round at top and bottom

ELECTRIC FURNACE MELTING PROGRESS

A LIST OF METAL ALLOYS ACTUALLY MADE

Metals—	Condition of Metal Charge:	State of Alloy after Melting:	KW. Hrs. Per Ton	Metal Loss	
Red Brass:					
Cu 80	Scrap pig	Foundry castings	250	.25 to .7	
Zn 10	Scrap pig, electro. cathodes	Wire bar	to	Depending upon	
Sn 6	Scrap pig	Billets	400	manipulation of	
Pb 4				furnace	
Yellow Brass:					
Cu 60	Scrap pig, electro. cathodes	Foundry castings	220	.50 to 1.5	
Zn 39.5	Scrap bar	Wire bar	to		
Pb 00.5		Billets for rolling	350		
				Alloy	
	Condition of Alloy Charged:	State of Alloy after Melting:	KW. Hrs. Per Ton	Loss	Temp.
Alloy:					
Red brass	Yellow brass and copper or red brass and zinc pig, scrap and sprues, turnings and chips	Foundry castings	225	.15	
		Wire bar	to	to	
		Billets	300	.50	1300°
Yellow brass	Red brass and zinc or yellow brass and zinc pig, scrap, sprues, turnings and chips	Foundry castings	200	.40	
		Wire bar	to	to	
		Billets	275	1.00	1100°C
Monel:			500	No oxida-	
Copper	Scrap and billets	Foundry castings	to	tion	
Nickel		Billets	750		1600°C
Aterite	Cu. sprues, scrap	Foundry castings	500	2% zn. loss	
	Ni. Virgin metal Zn	Billets for drawing and rolling	to	out of 32%	
			750		1650°C

PROGRESS IN METAL FINISHING

A Description of the Operations as Practiced at the Corona Typewriter Company, Inc., Groton, N. Y.

Written for the Metal Industry by P. S. Brown*, Works Manager

The new factory of the Corona Typewriter Company, Inc., Groton, N. Y., was completed in 1917, and the finishing departments began operation about the middle of that year. The factory was designed to meet the increased production that the old factory was incapable of handling. The factory is of reinforced concrete construction, and is designed for securing the best possible working conditions, particular attention being given to ventilation and lighting. The finishing departments are located so as to handle the flow of parts in a most economical manner, the polishing and plating departments being on the ground floor, and the japanning department on the third floor. The location of the finishing departments has done away with the necessity of routing work back on other work that is flowing forward.

In laying out the various finishing departments the same question of flow was carefully considered so that parts coming into one end of the room would flow forward continuously and out at the other end, thereby avoiding congestion and the return flow of partially finished parts on new parts coming through.

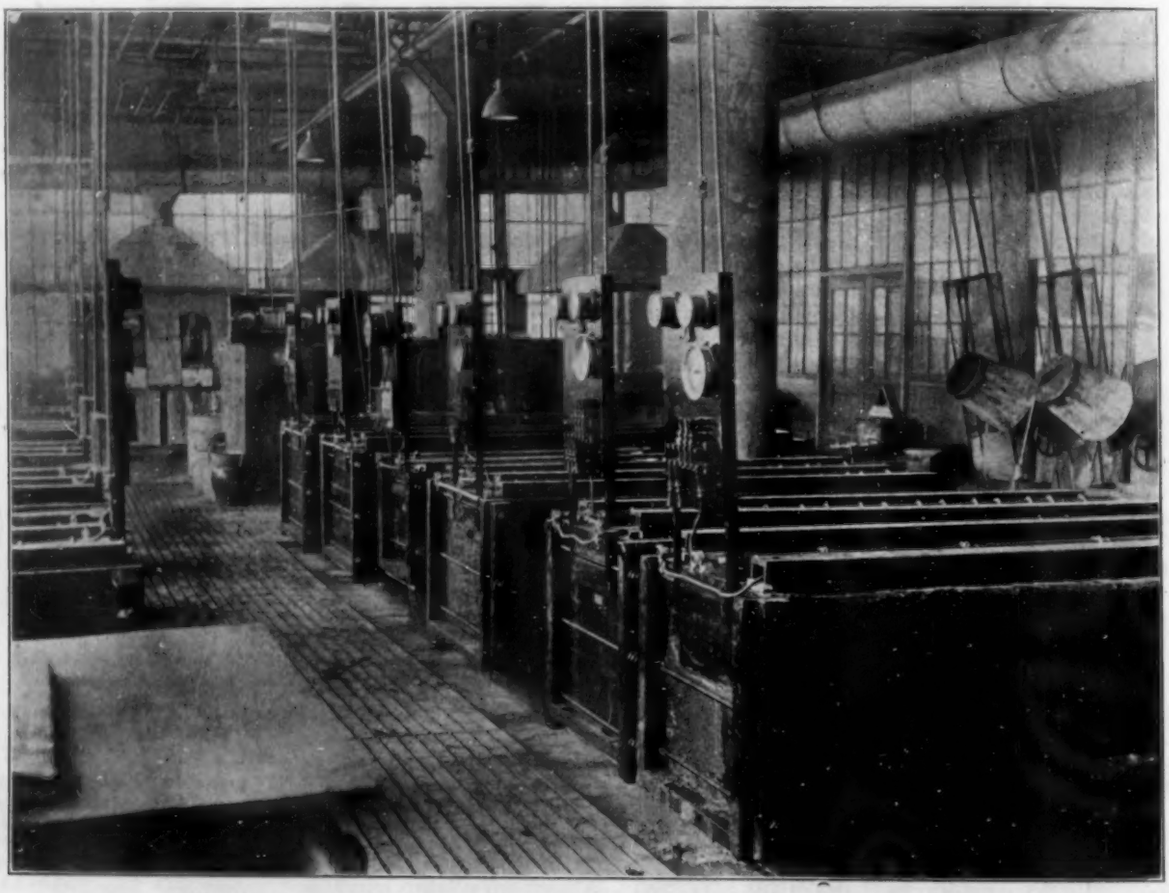


FIG. 1—THE PLATING ROOM AT THE CORONA TYPEWRITER COMPANY'S PLANT, GROTON, N. Y.

PLATING DEPARTMENT

Some idea of the plating department of the Corona Plant is given in Fig. 1 which shows the location of the nickel plating tanks in the foreground and the cleaning tanks in the background. New work comes in at the door shown at the right background and goes into the wiring and racking room, which is behind the glass partition shown at the rear of the cleaning tanks. In the wiring and racking room female operators are employed and racking and wiring are done on piece work. When racking or wiring is completed, parts come out of the room and are cleaned in the electric cleaner shown in Fig. 2. The two tanks to the right in Fig. 2 are electric cleaners and the work, after being cleaned, is rinsed in tanks to the right of the picture not shown and is then placed in the hot electric copper solution shown in the two tanks to the left, both of which are individually controlled by rheostats. It will be noted that both the cleaning and copper plating tanks are covered with hoods so that all steam and fumes are carried out of the room. This has made a marked difference in the room conditions and even on very damp and humid days the department is practically free from steam. After being copper plated the work is rinsed in clean water in the tanks shown in the left foreground of the picture, and is then carried forward to the nickel plating tanks shown in Fig. 1.

In the background between the plating tanks and the cleaning tanks is shown a partition housing the motor generator sets which supply the current to the nickel

*[Mr. Brown is well known to readers of THE METAL INDUSTRY for his articles on electro-plating subjects and his activities in the electro-plating field.—ED.]

plating, coppering and cleaning tanks. The cleaning and copper plating tanks are operated on the three wire system, from an individual motor generator set which also operates the plating barrel partially shown between the plating tanks and the partition. The current for the plating tanks is carried forward on heavy bus bars and tapped off to the front of the tanks. It will be noticed that this is different from the usual practice where the rheostats are placed at the back of the tanks rather than at the front. One reason for the new arrangement is an economy in bus bars, with a reduction in the loss due to the voltage drop, and the other reason is that the location of the panel boards enables the supervisor of the department to check up operating conditions quickly. The location of the motor generator sets is more or less central, the idea being to economize in bus bars and to reduce the voltage drop.

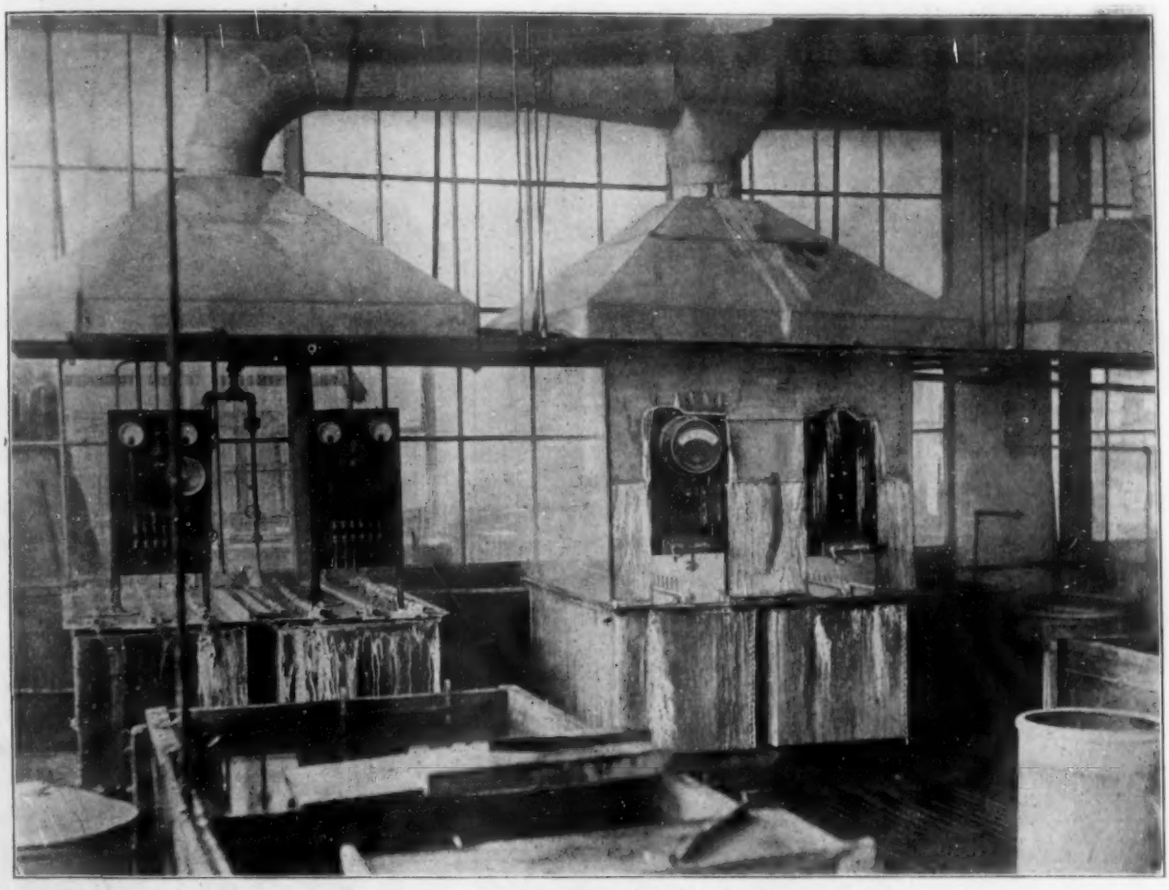


FIG. 2—ELECTRIC CLEANERS AT THE PLANT OF THE CORONA TYPEWRITER COMPANY, GROTON, N. Y.

It will be noted that each of the plating tanks is equipped with an individual control board. These boards were especially constructed for the Corona Typewriter Company by the Crown Rheostat and Supply Company, Chicago, Ill., and they provide a very close control of the tank. Each panel board is equipped with rheostat, voltmeter, ammeter, time dial, and a place for the instruction card.

An examination of Fig. 1 shows that the floors, which are of concrete, slope toward a central drain and that a slat walk is provided so that the operators' feet will not become wet. By this plan it is possible to wash off the tanks and flush the floors at any time, the water being carried to the central drain.

Some of the smaller parts are tumbled in the barrels shown to the right of the picture and then start forward the same as parts that have been racked or rinsed. After being nickel plated the parts are carried forward to a cold and hot water rinse (not shown in the picture) and are then dried by means of specially designed drying box into which warm air is blown by a high speed fan. This is used in place of the ordinary means of drying and to avoid the clogging of holes, slots, etc., with sawdust.

The work after being dried is carried to an inspection center located at the end from which the photograph was taken, and is there inspected, counted, and forwarded to the next department.

Only nickel plating is done at the Corona Plant, the copper plating being merely a preliminary operation which acts as an additional cleaning operation and prevents rusting on parts that are not nickel plated immediately.

All nickel plated parts receive a deposit of nickel that will serve to meet the abnormal conditions that a machine like the Corona is obliged to encounter. The nickel plated parts must withstand great changes in temperature and humidity, the machine being subject to Arctic cold and Tropical heat and moisture. Inasmuch as the majority of the parts of the machine are made either of aluminum or steel it is obvious that the protection of the steel against rust, and the aluminum against the corrosive action of the atmosphere, is of the greatest importance. These features have been carefully studied by the efficiency engineers of the Corona Company and are never lost sight of during the manufacturing operations.

POLISHING DEPARTMENT

Part of the polishing department is shown in Fig. 3,

and it will be noted that the old type of belt-driven jacks has been done away with, the entire department being equipped with double jacks with individual motor drive. These have not only proven highly efficient but have shown themselves to be satisfactory in every way and have enabled the Supervisor to keep his department in better shape than the average polishing department.

The air drawn through the hoods in this department is washed and returned to the room. This keeps a better balance of heat in the department and does not prove as expensive as the methods whereby air is drawn from the room very rapidly and has to be replaced either with cold or warm air. Ventilation is taken care of by a special ventilation system which operates in the entire factory. Fig. 3 shows the department exactly as it appears during working hours. The machines have just been vacated by the employees to enable the photographer to secure his picture. The day being dark, it was impossible to photograph the room with the operators at the wheel because of the length of the exposure required. The picture does not give a very good idea as to the size of the room but does show the equipment used. Cast iron, steel, and aluminum are polished and buffed in this room, the methods being practically the same as those generally used in polishing departments employed on a similar class of work.

FIG. 3.—PART OF THE POLISHING DEPARTMENT AT THE CORONA PLANT.

JAPANNING DEPARTMENT

The Corona demands a very high class of japan finish and therefore the utmost care is exercised in the japanning room. Fig. 5 shows one row of spray booths with five operators at work. In the foreground, paper labels are being varnished. Another operator is doing the first operation on the aluminum frame. Another series of booths in the same department are not shown in the picture. The spray room is separate from all the other sections of the japanning department and every effort is made to prevent the accumulation of dust and to secure a high finish.

Fig. 4 shows one of the three baking ovens located in a special room between the rubbing room (part of which can be seen through the open door in the picture) and the spraying room which is back of the position from which the photograph was taken. The baking ovens are electrically heated and equipped with an automatic heat control. When the maximum temperature is reached the current is automatically shut off and when the minimum heat is reached it is turned on. Adjustments can be made for the maximum and minimum temperature required. The clocks hanging on the oven indicate when the loads are to be taken out. Each oven accommodates two trucks and there are therefore clocks for each one of the trucks which may have gone in at different times.

In addition to the two rooms described and the rubbing room, part of which is shown in the background, there is a dipping room for key levers and a transfer room where the various transfers used on the Corona are applied. As stated in another part of this article, the japan finish is very important inasmuch as it adds both to the appearance of the machine, and as a protection to the aluminum and steel. In tropical climates unprotected or poorly protected aluminum will oxidize and will become unsightly in appearance and therefore a better japan finish is placed on the Corona frames and the other aluminum parts than would ordinarily be considered necessary for commercial purposes.

ELEMENTS OF ELECTRO-CHEMISTRY

SOME INSTRUCTION FOR THE PLATER WHO WISHES TO UNDERSTAND THE THEORY OF WHAT HE DAILY PRACTICES. WRITTEN FOR THE METAL INDUSTRY BY JOSEPH HAAS, JR.*—SIXTH PAPER.†

PROCESS OF ELECTROLYSIS.

We will now take up the mechanism of electrolysis. The electro-chemical reaction is distinguished from the purely chemical in that in the former the products appear only at the electrodes, while in the latter the products appear throughout the entire mass. When electrolytes have been dissolved ionization takes place immediately. When two electrodes, connected to a source of current as a dynamo or battery are immersed into the solution, products at once appear at both electrodes. The positive electrode, or anode, exerts an attractive force on the negative ions, and repels the positive charges, while the negative pole or cathode attracts positive ions and repels the negative ions. As a result negatively charged ions, or anions, go to the anode, and positively charged ions, or cathions go to the cathode.

At the electrodes the ions are discharged, or in other words their charges are neutralized and become ordinary atoms or molecules, at the same time a part of the electricity with which the electrodes were charged becomes neutralized. The charges on the electrodes, which have been neutralized by the ions are immediately renewed by the dynamo or battery. As a result of the pull exerted on the ions by the charges on the electrodes, the ions move through the solution, and since they are electrically charged, they thus transport the current through the solution. This view is radically different from the one that platers have of the passage of a current of electricity through a solution. The common idea, is that electricity actually passes through a solution, the same as a person may be said to pass from one side of the street to the other side.

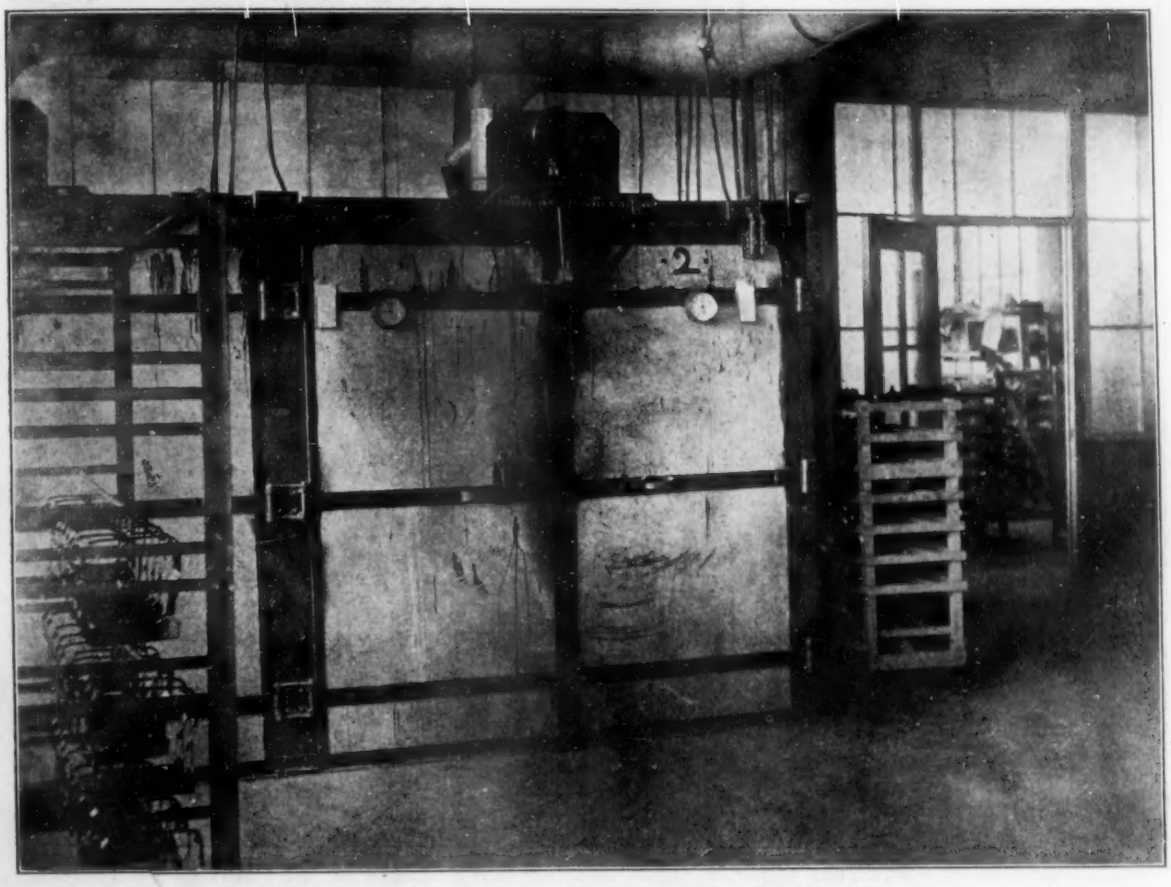


FIG. 4—ONE OF THE THREE BAKING OVENS AT THE CORONA TYPEWRITER COMPANY'S PLANT AT GROTON, N. Y.

During the process of electrolysis, if those products appear in the atomic or molecular state which were present in the solution in ionic state, they are called "primary products of electrolysis"; but if the products are not the same as those that existed in the ionic state, they are called "secondary products of electrolysis." To illustrate: if a solution of $CuSO_4$ is electrolized between two copper electrodes, on the negatively charged electrode copper is deposited. Copper is a primary product of electrolysis because it existed in the solution as Cu + + ions. At the anode apparently nothing took place that could be observed. But all platers know that in the sulphate of copper solution, copper is dissolved

*Sergeant Haas is now with the overseas surgical instrument repair unit with the American Expeditionary Forces in France.

†This series began in April, 1918.

off the anode. The reaction is $Cu + SO_4 = CuSO_4$. The formation of sulphate of copper is a secondary product of electrolysis. If a solution of sodium hydroride (Na OH), is electrolized between platinum electrodes, it will be observed that gases are violently given off at both the anode and cathode. The ions in a Na OH solution are $Na^+ + OH^-$. The evolution of gas at the cathode is due to the fact that Na^+ ion, when it becomes neutralized at the cathode becoming a Na atom, reacts with water, evolving hydrogen gas. $2\ Na + 2\ H_2O = 2\ Na\ OH + H_2$. At the anode, oxygen gas is given off, because OH not being able to dissolve

FIG. 5—ONE ROW OF BOOTHS FOR SPRAYING JAPAN ON TYPEWRITER FRAMES AT THE PLANT OF THE CORONA TYPEWRITER COMPANY, GROTON, N. Y.

platinum anode reacts with another OH, thus: $4\ OH = 2\ H_2O + O_2$.

REACTIONS AT ELECTRODES.

During electrolysis, the following are the reactions that may take place at the electrodes:

(1) A discharged ion reacts with itself. This is the case of the electrolysis of NaOH between P t electrodes at the anode.

(2) A discharged ion dissolves in electrode. This frequently happens in nickel plating where the hydrogen evolution is great, resulting in what is commonly called a pitted deposit.

(3) Discharged ion reacts with electrode. This happens in all plating solutions at the anode.

(4) A discharged ion reacts with solvent. This happens in electrolysis of Na 0H between Pt electrodes, the Na atom reacting with water. In cyanide copper, brass, and zinc solutions, this reaction also takes place.

(5) Discharged ion reacts with solute. This happens in cyanide silver, copper, brass and zinc solutions.

In cases of electrolysis of alkali metals and the acids between platinum electrodes, the products are in some cases primary, secondary, but more often both take place, one at the anode and the other at the cathode. It is unnecessary to go into detail about these, as they are of no interest to the plater. Instead, the reactions occurring at electrodes of the common plating solutions will be given. The reactions occurring at the electrodes may be exceedingly complicated, if composition of solution is complicated. For this reason, solutions of the most simple nature will only be taken.

The "acid copper solution" made up of $Cu\ SO_4$ and $H_2\ SO_4$ has reactions occurring as follows:

ANODE	(1)	$Cu + S\,O_4 = Cu\,S\,O_4$.
	(2)	$Cu + S\,O_4 = Cu\,S\,O_4$.
ELECTROLYTE	(1)	$Cu^{++} + S\,O_4 =$.
	(2)	$2\,H^+ + S\,O_4 =$.
CATHODE	(1)	Cu deposited.
	(2)	$Cu\ S\ O_4 + 2\ H = Cu$ deposited $+ 2\ H_2SO_4$.

Under ordinary conditions reaction (1) takes place most of the time. If, however, the voltage used becomes

high due to increase in resistance hydrogen may be evolved at cathode. The addition of sulphuric acid to the solution prevents hydrolysis and the increase in conduction of the solution.

The "cyanide copper" solution is primarily a complex salt of formula $Na\ Cu\ (CN)_2$. The ions are $Na^+ + Cu\ (CN)^-_2$. There are also ions $Na^+ + CN^-$ from free cyanide.

ANODE
(1) $Cu\ (C\,N)_2 + Cu = 2\ Cu\ C\,N$.
(2) $Cu + C\,N = Cu\ C\,N$.
(3) $Cu\ C\,N + Na\ CN = Na\ Cu\ (C\,N)_2$.

ELECTROLYTE
(1) $Na^+ + Cu\ (C\,N)^-_2$.
(2) $Na^+ + C\,N^-$.

CATHODE
(1) $Na + Na\ Cu\ (C\,N)_2 = 2\ Na\ C\,N + Cu$ deposited.
(2) Same as above in (1).

There is also an evolution of H at the cathode, due in one case to the high voltage used, so that current decomposes water and in the other, that some Na^+ ions when they have their charges neutralized, do not react with their equivalent of $NaCu\ (CN)_2$, but on becoming atoms react with water evolving hydrogen. There is also a tendency at the anode to form $Cu\ (OH)_2$, or Cu0 if free cyanide content is kept small. If carbonates are present in the solution, there is also a possibility of the formation of a basic copper carbonate at the anode. The copper cyanide formed at the anode, is dissolved by free cyanide present, again forming the complex salt $Na\ Cu\ (C\ N)_2$.

The "single nickel salt" solution consists of $Ni\ S\ 0_4$ and $H_3\ B\ 0_3$.

ANODE $Ni + S\ 0_4 = Ni\ S\ 0_4$.
ELECTROLYTE $Ni^{++} + S\ 0_4 =$.
CATHODE Ni deposited.

The boric acid plays but little part in conduction, as it is but slightly dissociated. Its main purpose is to prevent the hydrolysis of $Ni\ S\ 0_4$ and give the nickel solution the slight acidity which is required for the proper deposition of this metal. With this solution there is very little tendency to form free $H_2\ SO_4$ due to nickel anodes becoming passive (that is resisting the solvent action of SO_4 if electrolysis is carried on at not too high a voltage.

The "double nickel salt" solution reactions can become very complex under certain conditions. The old formula for this solution used to be made up of only the double salt, $(NH_4)_2\ Ni\ (SO_4)_2$, but is now replaced by a solution containing, besides the double salt, $Ni\ S\ 0_4$ and $H_3\ B\ 0_3$.

ANODE
(1) $Ni + Ni\ (S\ 0_4)_2 = 2\ Ni\ S\ 0_4$.
(2) $Ni + S\ 0_4 = Ni\ S\ 0_4$.

ELECTROLYTE
(1) $2\ N\ H_4^+ + Ni\ (S\ 0_4)_2$.
(2) $Ni^{++} + S\ 0_4^=$.

CATHODE
(1) $2\ NH_4^+ + (NH_4)_2\ Ni\ (SO_4)_2 =$ Ni deposited $+ 2\ (NH_4)_2\ SO_4$.
(2) Ni deposited.

The "cyanide-silver" solution consists of the complex salt $NaAg\ (CN)_2$ and a certain amount of free Na CN.

ANODE
(1) $Ag\ (CN)_2 + Ag = 2\ Ag\ CN$.
(2) $Ag + CN = Ag\ CN$.
(3) $Ag\ CN + Na\ CN = NaAg\ (CN)_2$

ELECTROLYTE
(1) $Na^+ + Ag\ (CN)_2^-$.
(2) $Na^+ + CN^-$.

CATHODE
(1) $Na + Na\ Ag\ (CN)_2 = 2\ Na\ CN + Ag$
(2) Same as in (1).

In zinc solutions, a substance which has heretofore been ignored has to be taken into consideration. The substance is water. In previous reactions, the ions of water, H^+ and OH^- played very little part. But in zinc solutions, due to the high voltage used and the Zn^{++} ions not being replenished to cathode areas as fast as they are deposited, a large amount of the current is used up in decomposing water, H being evolved at the cathode. There is another reason for the evolution of H besides lack of ion concentration which, however, will be dealt with under Electro-Motive Force.

In "zinc-sulphate" solutions the reactions are:

ANODE
(1) $Zn + SO_4 = Zn\ SO_4$.
(2) (a) $4\ OH = 2\ H_2O + O_2$.
(b) $Zn + 2\ OH = Zn\ (OH)_2$.

ELECTROLYTE
(1) $Zn^{++} + SO_4^=$.
(2) $H^+ + OH^-$.

CATHODE
(1) Zn.
(2) (a) $Zn\ SO_4 + 2\ H = H_2SO_4 + Z$
(b) H evolved.

The "complex cyanide salt" of zinc solution has the formula $Na_2\ Zn\ (CN)_4$. Reactions:

ANODE
(1) $Zn + Zn\ (CN)_4 = 2\ Zn\ (CN)_2$.
(2) $Zn + 2\ CN = Zn\ (CN)_2$.
(3) (a) $4\ OH = 2\ H_2O + O_2$.
(b) $Zn + OH = Zn\ (OH)_2$.

ELECTROLYTE
(1) $2\ Na^+ + Zn\ (CN)_4^=$.
(2) $Na^+ + CN^-$.
(3) $H^+ + OH^-$.

CATHODE
(1) $Na_2\ Zn\ (CN)_4 + 2\ Na = 4\ Na\ CN + Zn$.
(2) Same as in (1).
(3) H evolved.

In brass and bronze solutions the same reactions occur as in copper and zinc solutions, the color being produced according to the rate at which each metal is precipitated and upon the concentration of each ion in the cathode area.

ANTIMONY SOLUTION FOR FINISHING

Antimony solutions are used to some extent in producing a Flemish brass finish. A solution prepared from chloride of antimony, which is also termed butter of antimony, gives good results when used in the following proportions:

Water	1 gallon
Muriatic acid	2 gallons

Then add the concentrated solution of chloride of antimony until a uniform deposit is obtained. Anodes of antimony or carbon may be used. In the absence of these materials nickel anodes may be used, but should be removed whenever the solution is not in use. A weak current should be used, as otherwise the antimony deposit will be a dull black. Muriatic acid must be occasionally added to the solution to hold the antimony in suspension, otherwise the solution becomes milky or turbid and inactive.

Antimony may also be deposited from an alkaline solution made up as follows:

Water	1 gallon
Soda ash 58 per cent	8 ounces
Sulphide of antimony	6 ounces

The solution should be prepared as follows: Dissolve the soda ash and antimony in 3 parts of water, boil for a short time, then add the balance of the water cold. It is advisable to filter the solution through several thicknesses of cheese cloth to remove the undissolved antimony which may later be re-boiled with soda ash. The solution should be used at a temperature of 80 degrees Fahr., with anodes of antimony, steel or carbon. Voltage—2 to 3, and amperage 3 to 4 square foot of surface. The antimony chloride solution is used cold.—C. H. P.

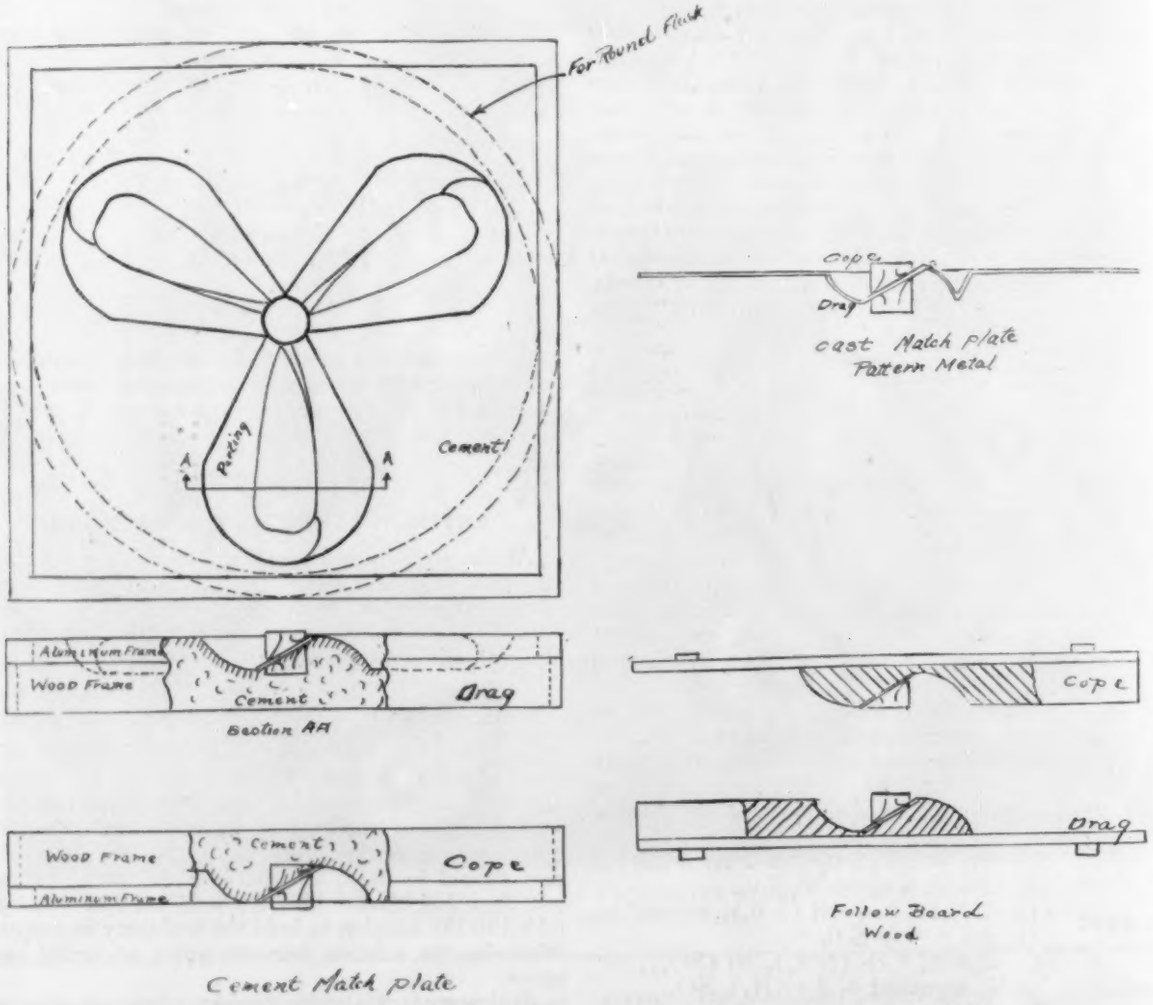
THE MANUFACTURE OF SMALL PROPELLER CASTINGS

A Practical Suggestion for Speeding Up Their Production

In the manufacture of small propeller castings, the parctice followed by a certain concern is to make them by the bench and floor methods. We are asked to suggest a more rapid way. W. J. Reardon, superintendent of Foundries Aluminum Casting Company, Cleveland, Ohio, advises the following:

"I would recommend the use of a roll over machine There are a number of such machines on the market. This method is cheap and is used to increase production approximately a hundred per cent as compared with floor molding where new patterns have to be made. I would also suggest the follow board pattern when new patterns are being made and this method should increase production 200 per cent over floor work."

The accompanying sketch will explain in detail the method of making plates and follow board patterns.



A SERIES OF SKETCHES SHOWING HOW W. J. REARDON WOULD CAST SMALL PROPELLERS.

Where a limited number is wanted, I would suggest the follow board pattern or a Portland cement match plate, made as follows: Cast two single patterns, make two frames of aluminum the size of your flask and to match the flask. Make the frame approximately 2 by 2 inches by the side of the flask. Ram up and mold in the regular way, placing the other pattern in the cope and leaving the one in the drag. Oil the pattern well, then place the aluminum frame on each half. Build up with wood a box the height of your pattern, then pour in Portland cement and let stand for a few hours, then shellac the mold and the pattern is ready for use.

PHILIPPINE FOREIGN TRADE.

The foreign trade of the Philippine Islands for 1918, as shown by a report from the office of the Governor General, was:

Imports	$197,198,423
Exports	270,388,964
Total	$467,587,387

Of this plated metal ware and gold and silver was imported to the amount of $1,163,118, while metals, metal compositions and manufactures to the amount of $101,549 were exported.

EDITORIAL

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CONTENTS

PROPER SELECTION OF MATERIALS

Every once in a while we hear of a controversy between a producer or manufacturer of some metal product and a consumer because the material in question did not do what it was supposed to. After considerable correspondence and conferences and in some cases even involving a lawsuit it is discovered that the trouble could all have been averted if the buyer and seller had gotten together at the start and agreed upon just what was wanted; that the material proposed was exactly the proper thing for the purpose for which it was required. Unfortunately this is too often not done and trouble results which costs both sides both time and money.

An interesting case which very clearly illustrates what we mean has recently come to our attention. Last fall a sub-contractor on government work furnished some screens having a square mesh and made from No. 10 "half hard" brass wire. At no time in the specifications or orders was any particular quality of wire specified, hence ordinary good quality material was presumably intended and furnished. It now develops that these screens have become so brittle that they can be broken up in handling or by gripping the mesh in the hand. The screens throughout the winter had been assembled into copper ship ventilators and then were stored in a yard surfaced with a layer of cinders and exposed however, to a damp atmosphere from a lake.

The customer who received the wire claims that the wire which failed (it apparently did not all fail) was bad and the rest was good. He furnished an analysis of the "good" and "bad" wire as follows: "good" wire copper, 66.96%, zinc 32.88%, lead .16%. "Bad" wire—copper, 65.24%, zinc 34.50%, and lead .26%.

There is absolutely nothing to be deducted as to the cause of the failure of this "bad" wire from its analysis. That the "good" wire did not also fail is only a "freak," there is no reason why it should not fail as it had every opportunity to do so! The whole trouble here is in using a mixture or alloy of copper and zinc, totally unsuited for the purpose for which it was used. Under the conditions any brass mixture running from 60 copper up to 70 copper with the corresponding 30 to 40 per cent of zinc would fail.

The key to the trouble was a double decker, in the first place the mixture was wrong, in the second place it should not have been "half hard," but "soft" if it was to be used at all. What really happened then to this wire was that it suffered internal strains when it was first manufactured. These strains were still further increased or intensified when the wire was woven and crimped when assembled in the screens.

The atmosphere where the screens were stored was probably charged with smoke from soft soal which always

carries sulphur. This sulphur would, together with the moisture in the air, form dilute acids which in acting on the surface of the wire in connection with the internal strains cause what is now called "corrosion cracking." This is because corrosion is necessary to localize the action of such strains and bring about the rupture of the material.

A well known metallurgist on being consulted about the above case stated that "He believes it to be a mistake to use hard brass wire for outside exposure where weathering will sooner or later make trouble such as apparently came about in this case. If 80% copper and 20% zinc (low brass) or 85% copper and 15% zinc (rich low brass) or even 90% copper and 10% zinc were used then there would be no trouble of this kind.

So we see that after all even some of the most puzzling and aggravating cases may be solved by the simple expedient of conferring freely and openly before the material is actually ordered and fabricated.

In other words, closer co-operation between the producer and consumer is needed and in the case just cited when a third party enters into the deal this co-operation becomes even more important in order to avoid subsequent trouble.

THE OUTLOOK IN METALS

The past week has shown a decided improvement in the metal industries. There have been numerous inquiries for those metals entering into the construction of buildings for both dwellings and factories. Some of these have developed into real orders, and in consequence the news comes from New England, the home of the brass industry, that the mills are gradually going back to the ten hour day, the standard before the war. The action of such concerns like the American Brass Company, Scovill Manufacturing Company, Chase Metal Works, in resuming the ten hour day may be taken as an index of what is happening or will happen in the entire metal industry. In the middle west we get reports that the automobile industry, a vast consumer of metals, was never in better shape with some of the large plants having sold their output. The General Motors Corporation has just placed an order for 345,000 tons of steel which means an enormous amount of other metals will also be required for the production of automobiles for both pleasure and business. This move may be taken as evidence of a general increase in business due to the fact that manufacturers have come to the conclusion that Now is the time to go ahead and prepare for the rush of business that has been predicted.

From the other side comes the news that two large American companies have secured contracts for the reconstruction of Rheims, Nancy, and Soissons, ruined towns of France to the amount of $40,000,000 (200,000,000 francs). It is also a fact that there are representives of numerous foreign syndicates already here waiting upon the signing of the peace treaty to place large orders for goods of every description. Only ten days ago an order was placed in this country for forty tons of sheet brass for a large Italian automobile company, and while this is not a large order as orders have come to be regarded in war time, it is a sizable one for peace times and is not to be regarded lightly. A perusal of the letters from the various metal centers in the TRADE NEWS columns of this issue of THE METAL INDUSTRY will give a very good idea of business conditions now ruling and shows also what may be expected in the near future.

For the metal industry the future is bright with hope and it is especially so for the scientifically-trained practical technologist, for keen competitive prices mean "brains" at the head of affairs. Brains are and will be in demand, and will be paid a figure more in keeping with their value in the industry. Labor rates are high and the outlook is that they will remain so for some time to come, therefore, labor saving devices must be introduced as never before and less labor employed per plant. But with the growing expansion we can and will have more plants. We have learned much during the war, not the least of which is the number of things we can completely do without, and the number of things we previously regarded as essentials that can be successfully replaced by substitutes.

This knowledge has not gone to waste, new processes and new methods, which will produce better results out of inferior raw materials at less cost are ready. A good example of this is shown in the report of the methods employed by the Government at the Naval Gun Factory at its Navy Yard in Washington, D. C., for the manufacture of manganese bronze. This was described by P. E. McKinney and published in THE METAL INDUSTRY for February, 1919.

The Government has put a premium on the lounger and the whole industry is suffering for the lack of good labor as evidenced by the advertisements appearing in the daily, weekly and monthly press. The Government instead of eliminating waste and conserving energy inaugurated a system that bid fair to do just the opposite. What is needed now is a speeding up of the liquidation process, a definite governmental policy regarding business and a labor market amenable to reason. With these things in sight and the world's markets hungering for metals and materials of every class there is no reason why we should not soon be entering upon a period of glorious prosperity.

AMERICAN ELECTRO-PLATERS CONVENTION

The opening article in this issue of THE METAL INDUSTRY gives the last word about the seventh annual convention of the American Electro-Platers' Society to be held at the Bellevue-Stratford Hotel, in Philadelphia, Pa., July 1-2-3. There is nothing now left for the man at all interested in the finishing of metals, be he a manufacturer or practical man, to do but to write for hotel reservations and inform everybody at the home plant that he will be "out of town" July ONE, TWO, and THREE!

SHOP PROBLEMS

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE

ASSOCIATE EDITORS: JESSE L. JONES, Metallurgical PETER W. BLAIR, Mechanical CHARLES H. PROCTOR, Plating-Chemical

ALLOYING

Q.—We are making an alloy known as Lumen metal consisting of

Zinc	88
Copper	10
Aluminum	10

The metal runs flakey. Should we change the mixture so the castings will come clean and solid?

A.—The original formula for Lumen metal was

Zinc	85
Copper	10
Aluminum	5

The copper and aluminum should be melted together in a crucible and then poured into the zinc that has been melted separately in a Schwartz furnace. When pouring into castings, cool down as low as possible and pour rapidly using very large gates.

Lumen metal is essentially a die casting alloy and is usually poured into metal molds. Very satisfactory bushings can be made by direct pouring into iron molds without using any pressure except the static head of the metal in the gates. Where a somewhat softer metal is desired, the following mixture may be used:

Zinc	88
Copper	4
Aluminum	8

By using Horsehead zinc, a tensile strength of from 40,000 to 50,000 may be had but none of these alloys have any appreciable ductility.—J. L. J. Problem 2,706.

CASTING

Q.—We have a few babbitt rings to cast at times and have trouble in getting them solid. We would like very much if you will inform us the proper way to cast babbitt.

A.—Cored sticks, "chill cast" in white bearing metals may be obtained from the leading manufacturers of babbitt in a large variety of sizes. These sticks are usually 12 inches in length so that a number of rings may be cut from a single stick. The sticks are free from blowholes and more economical than ordinary castings.

When rings of very large size are wanted, they may be sand cast very successfully from a number of white brass alloys. The following alloy produces very good castings and in service it shows a lower coefficient of friction than the average babbitt, viz.:

Copper	2
Tin	64
Zinc (high grade)	34

This alloy is preferably melted in graphite crucibles and if the sticks to be cast are rather long, one end of the flask should be raised a few inches, to assist in running the castings.—J. L. J. Problem 2,707.

CLEANING

Q.—What is the best arrangement of steam pipes for an electric cleaner where a welded steel tank 6 feet by 20 inches by 30 inches deep is used, the tank being made positive and the steam pressure only about 8 or 10 pounds?

A.—The best results are obtained from steam coils when they are arranged along the side of the tank nearest to the operator putting the work in the tank, or what might be called the front side. The advantage is that the heat generated in the coils will have a tendency to throw the solution backwards and the dirt accumulated will also flow towards the back of the tank, leaving the front side clear and the cleansed work is not liable to come in contact with such dirt when being lifted out of the tank. The coils should extend upwards to within about six inches from the top of the solution. In cleaning the articles always work from the coil side. A double throw switch should be used and the articles first made the cathode for a short time and then the current reversed for a few seconds, the articles becoming the anodes. Any oxide will under such conditions be readily removed.—C. H. P. Problem 2,708.

ETCHING

Q.—What is the best proportion of nitric acid and water to use in etching on steel, where a resist ink is used in the transfer process? Also how much surface ought to be etched with a given amount of acid where the work is done on a large scale? What is the best neutralizer?

A.—In etching steel, one part of nitric acid to three or four parts of water may be used, depending upon how hard the steel surface is, and a little experimenting will determine the correct strength.

We do not have any figures for determining how much surface can be etched with a given amount of acid. This is another problem that can only be solved by experimenting. Any alkali can be used as a neutralizer. Some operators use ammonia water (26%), others solutions of sodium carbonate or sodium hydroxide or tri-sodium phosphate.—C. H. P. Problem 2,709.

FINISHING

Q.—We are desirous of getting an imitation silver plate on copper plated steel spoons. We understand that there is such a plating solution, but have not been able to find out its composition, although we understand an anode composed of the following is used:

Tin	6 pounds
Antimony	12 pounds
Copper	¼ pound
Bismuth	1 ounce

A.—The imitation silver you refer to is probably a white alloy produced from copper and tin. If a copper cyanide solution is prepared and then a concentrated solution of tin chloride and sodium hydroxide dissolved in water is added in such proportions that a white alloy is produced we believe it will imitate silver very well and will not oxidize readily.

We are unable to give you the exact proportions of such a solution. The amount of tin to be added will have to be determined by experiment.

The formula you give as an anode is an old one. The alloy produced from the composition is a White Bronze, or some times termed a Chinese Silver. We doubt whether such a combination would dissolve as an anode in solution. The tin and copper would dissolve, but the antimony would probably settle to the bottom of the solution of cyanide and caustic soda, as antimony is only dissolved in hydrochloric acid.

However, you could maintain anodes of an alloy of tin and copper or separate anodes of tin and copper. Or use insoluble anodes of steel or carbon and feed the solution with concentrated solutions of copper and tin. Deposits of tin alone give a very whitish finish similar to silver, but copper and tin wears much better.—C. H. P. Problem 2,710.

GALVANIZING

Q.—How is zinc ammonium chloride used in hot galvanizing in place of sal ammoniac?

A.—Zinc chloride is used in hot galvanizing for a swabbing mixutre to treat the work with before it is put into the zinc bath and this zinc chloride is usually made by dissolving zinc in muriatic acid until the acid will dissolve no more zinc, or

in other words, a saturated solution of zinc in muriatic acid.

Sal ammoniac or chloride of ammonia is used as a cleaning flux upon top of the zinc bath and the product known to the trade as gray sal ammoniac is entirely satisfactory for this purpose.

Some concerns may buy both zinc chloride and ammonium chloride and mix them together, although we fail to see what would be gained by this practice, as either one of the two products may be used separately with equally good results. —K. Problem 2,711.

MELTING

Q.—We are considering the putting down of pit type gas-fired crucible furnaces for melting Admiralty gun-metal. We have been advised, however, by friends who have a well-known maker's gas furnace installed that they are experiencing very much difficulty in obtaining the tensile test with metal melted in this furnace and the makers of the furnace are unable to help them. Is this a trouble which is found generally in gas-fired melting furnaces?

A.—It must be understood that, unless a considerable excess of air be admitted in a gas furnace at the burner in order to produce an oxidizing flame, there will be a large amount of reducing gases available for adsorption by the metal. The furnace atmosphere should be only slightly reducing (slight excess of incompletely burnt gas) *during* melting and slightly oxidizing (slight excess of air) when the metal is just about to melt.

Reducing gases (*e.g.*, H and CO), are more readily soluble in molten copper and gun-metal than oxidized gases (*e.g.*, CO_2). But, if a suitable protection be arranged, *e.g.*, a flux of, say, powdered glass or calcined borax, and a generous cover of charcoal, the gases may be kept more at bay. But gases can enter through the walls of the crucible, and in the coke-fired furnaces there is not the same pressure in the furnace as with gas. Furnace-gases are being continually taken off, and there is a constant defect of pressure with natural draught. Hence we think that the dangers of gas-absorption are less with natural-draught coke-fired furnaces than with gas-furnaces, but, with care they give satisfactory results.—W. T. F. Problem 2,712.

PLATING

Q.—Kindly advise how we can plate iron on copper.

A.—Many formulas for iron plating have been proposed, but the most simple ones have produced the best results. The greatest difficulty experienced is due to the great evolution of hydrogen, which becomes occluded in the deposit and thus produces brittleness. Too much free acid in solution causes the hydrogen to develop in excess, so it is advisable to keep the solution nearly neutral by adding small proportions of iron carbonate or sodium carbonate; or, better still, magnesium carbonate Below are given two solutions which should give excellent results:

1.

Water	1 gallon
Sulphate of iron and ammonia	1 pound
Sulphate of magnesium	4 ounces
Magnesium carbonate	1 ounce

Iron or steel anodes and 2 to 4 volts should be used.

2.

Water	1 gallon
Sulphate of iron	1 pound
Chloride of iron	4 ounces
Magnesium carbonate	1 ounce

The voltage and anodes should be the same as the first solution.—C. H. P. Problem 2,713.

Q.—Kindly advise what is the easiest and quickest method of plating nickel silver vanity cases, that are soft soldered and highly polished. The cases peel and we have been unable to do anything with them. Also kindly advise how to polish them afterwards in order to get a high polish.

A.—The safest method to pursue in silver plating vanity cases that are soft soldered to prevent peeling would be as follows:

First—After polishing and cleansing in the usual manner copper plate for a few minutes in a warm copper solution, preferably one made up with Trisalyt or cyanide of copper and cyanide of sodium. This solution should stand about 5 degrees Baumé.

Second—After copper plating as stated wash well in cold water and immerse in a blue dip or mercury solution. This dip consists of the following:

Red oxide of mercury	¼ ounce
Cyanide of sodium	6 ounces
Water	1 gallon

A momentary immersion will deposit a thin film of mercury upon the coppered surface; then rewash in water and silver plate as usual.

Third—To produce a high finish without cutting away the silver, buff with the aid of lamp black mixed with kerosene oil to a paste and apply a little to the buff the same as rouge. Afterwards wipe up on a slow running canton flannel buff using a little gold rouge mixed with denatured alcohol. These methods should give you a semi-burnished finish.—C. H. P. Problem 2,714.

SOLDERING

Q.—We wish to know how long grain brazing solder is made. We know the mixture used but wish to know the best way to manufacture same.

A.—Long grain brazing solder is obtained by allowing the bars of solder metal, after they have been poured, to remain in the mold until they are fairly cool. The more slowly the mixture cools the larger are the crystals made.

The bars of solder, after having been taken from the molds, are put into a furnace and heated to a cherry red and then put through the solder grinder and ground. The various degree products are obtained by means of screening.

Where it is desired to make all one grade of solder the material is cast in water cooled molds which causes it to set quickly and give the small fine grain.—K. Problem 2,715.

SPOTTING

Q.—We have some trouble in nickel plating zinc products in the way of spots which seem to grow worse when a weak current is used. We use the standard solution of double nickel salts, single nickel salts, magnesium sulphate, sal ammoniac and boracic acid. How can we test whether these copper streaks are due to the solution or the current? If more current is used the articles turn very black on the edges and this black polished off with the slightest touch on the buff. If less current is given the spots become worse. We have noticed that our nickel anodes have a copper color on the surface. What could have produced this copper color on the nickel anodes.

A.—We believe that in some manner some copper has gotten into your nickel solution. If you copper plate the zinc sheets first probably some of the copper solution still remains between the sheets when plated closely back to back. The edges of the sheets becoming very black when a fairly strong current is used would denote some copper and if much copper gets into a nickel solution the color will approach a black nickel instead of being white.

If the nickel anodes contain iron and the nickel solution is slightly acid the copper color would denote that there is copper in the solution and the iron in the anodes reduces the copper the same as might occur if iron is immersed in a dilute copper sulphate solution. A light pink tone on the anodes might, however, denote cobalt. Cobalt, however, would cause no trouble.

The only advice that we can give you would be to suggest that you add more nickel to the solution in the form of nickel sulphate—about 1 to 2 ounces or more per gallon of solution. Use more care and see that all the copper solution is removed from between the sheets.

In order to reduce the copper from the nickel solution, procure quite a quantity of sheet steel scrap, clean the steel thoroughly and wash and then let the scrap stay in the solution over Sunday. The iron will reduce the copper in the presence of a very small amount of acid in solution, and the copper will be deposited out on the steel.—C. H. P. Problem 2,716.

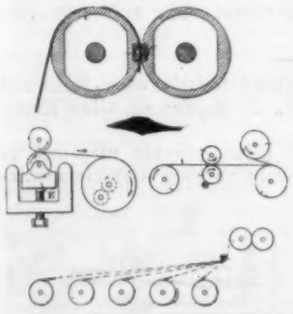
PATENTS

A REVIEW OF CURRENT PATENTS OF INTEREST

The age of these patent notices is due to the delay in the issuing of patent reports.—Ed.

1,296,934. March 11, 1919. **Process for Cutting and Piling Up Thin Aluminum Sheets.** Eugene Drouilly, of Paris, France.

The present invention has for its object a process for cutting up and piling up thin aluminum sheets, combined for the purpose of obviating the various disadvantages usually encountered.



By means of the present process the aluminum sheets are cut up and offered to the customer, without any possible soldering or adherence between them, according to pre-determined sizes, in the form of packs or bundles containing always exactly the same number of sheets, and these sheets are very easily taken hold of.

The improved process consists essentially:

(a) in simultaneously winding upon one and the same mandrel, as shown in cut, one or more aluminum bands or strips and paper strips, so that the paper coils are interposed between the aluminum coils;

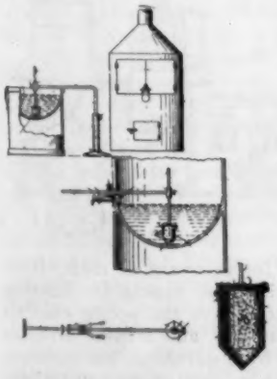
(b) in constituting reams of aluminum sheets placed flatwise and lined with paper, which reams are cut up from this roll formed of aluminum strips and interposed paper strips;

(c) in cutting up from these reams, according to the required size, packs composed of aluminum sheets and of intervening paper sheets.

The paper sheets thus interposed between the aluminum sheets constitute a non-adhering insulation for said aluminum sheets, entirely protecting the surface of the latter and allowing the cutting of the whole without any possible soldering of the aluminum sheets between them, by the means ordinarily used for cutting paper.

1,298,229. March 25, 1919. **Metal-Cleaning Apparatus.** A. H. Levy, of New York. Assignor to Syracuse Smelting Works, Brooklyn, N. Y.

This invention relates to improvements in metal-cleaning apparatus, and particularly to improvements in metal-cleaning apparatus using a flux, although not restricted to such apparatus; and an object of this invention is to provide a metal-cleaning apparatus which will be simple in construction, comparatively cheap in manufacture, and efficient and labor-saving in operation and use.



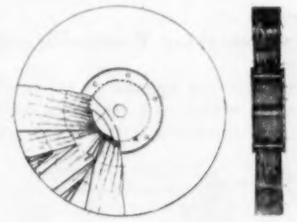
The patent covers:

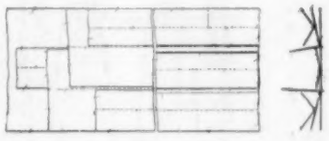
A metal-cleaning apparatus, as shown in cut, including a receptacle; a rod to which said receptacle is attached; a handle-bar in which said rod is mounted and which is angularly disposed thereto; and a weight for counter-balancing the thrust due to the buoyant effort of the molten metal in which said receptacle is held, said weight being adjustable to vary its counter-balancing effect.

A metal-cleaning apparatus including a receptacle; a rod to which said receptacle is attached; a handle-bar in which said rod is mounted and which is angularly disposed thereto; and a weight for counter-balancing the thrust due to the buoyant effort of the molten metal in which sadi receptacle is held; said handle-bar being formed with a raised portion by means of which the weight is kept at all times above the level of the molten metal.

1,298,522. March 25, 1919. **Buffing or Polishing Wheel.** Alexander Levett, of New York, N. Y.

The invention relates to buffing or polishing wheels made of cotton, wool, leather or other material, and its object is to provide a new and improved buffing or polishing wheel arranged to prevent the loss of the material of which the wheel is made and to permit of using the wheel until the material is worn away, practically down to the hub or center piece. Another object is to provide a buffing or polishing wheel which is exceedingly strong and durable and which can be cheaply and quickly manufactured with a minimum amount of material.

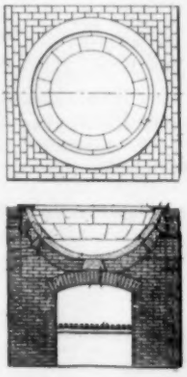




With these and other objects in view the invention consists of certain novel features of construction as shown in the cut.

1,298,692. April 1, 1919. **Zinc Kettle.** John G. Granberg, of Beckemeyer, Ill.

This invention relates to new and useful improvements in zinc kettles, and has for its special object the manufacture of a sectional kettle, as shown in cut, formed out of ceramic material, and one that can be fired from the bottom, thus making it possible for the application of a great amount of heat.



Heretofore in melting zinc, iron kettles have been employed and as the zinc attacks the iron, the life of such kettles has been of short duration. Then again, in such kettles, the amount of iron that is eaten up by the zinc produces a waste of the zinc, in a form of zinc dross.

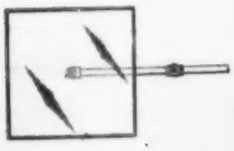
In the kettles which have been previously used, where brick was used in the construction, an iron frame or shell was used on which the brick was supported. In this type of kettle it was impossible to fire the kettle from below, on account of the iron shell, necessitating the firing of the kettle from above, in which cases a considerable amount of zinc was burnt, in the form of zinc oxid.

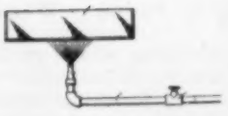
By the improved construction of kettle it is possible to fire the same from the bottom, the same as the old cast iron kettles, thus eliminating all zinc dross from the melting zinc, and furthermore a greater application of heat to the kettle is maintained, this arising from the fact that the entire kettle is constructed of ceramic material, and the supports on which it rests are constructed of the same material, and by the whirlpool circulation of heat around the kettle.

1,298,825. April 1, 1919. **Casting Metal Ingots.** Lewis B. Tebbets, 2d, St. Louis, Md.

This invention relates to a new and useful process for making metal ingots adapted for rolling into sheets.

An object of the invention is to provide a method, as shown in cut, of casting ingots in flat molds and cooling the mass



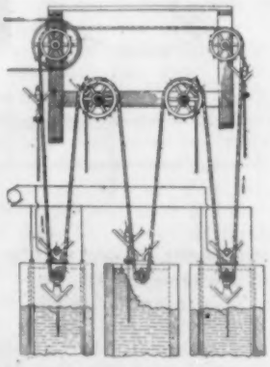


of the metal within the mold from the center outwardly, so that the outside of the ingot will be the last to cool thereby eliminating a shrinkage hole formation in the ingot, producing an ingot of uniform formation throughout so that there will be no wastage of metal when such ingots are rolled into sheets.

The accomplishment of this object, as well as other advantages, is effected by casting the metal in a flat open mold and cooling the ingot from the center outwardly by applying a cooling agent at the center of the molten mass so that the outer edges of the ingot will be the last to cool.

1,299,624. April 8, 1919. **Apparatus for Electro-Plating.** Harry O. Schuessler, Peru, Illinois.

This invention relates to electro-plating apparatus especially adapted for those processes in which the work is subjected to electrolysis in a series of different baths, such for example as when nickel plating, the work is generally exposed in a bath of sulfate of copper, thence in a rinsing bath, and finally in a nickel plating bath.

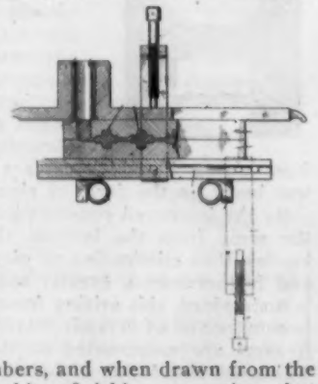


In the present invention, the inventor has aimed primarily, to provide apparatus by means of which electro-plating of the character described may be performed more economically and expeditiously and with more uniform results than has been heretofore possible.

In furtherance of this general object there is contemplated the provision of novel means as shown in cut for mechanically handling and carrying the work to be plated from one bath to another of a series at timed intervals, so that the successive plating and rinsing operations of whatsoever nature required are performed in proper sequence and timed relation.

1,300,723. April 13, 1919. **Casting Apparatus.** August G. Gutmueller, of Richmond Hill, New York, assignor to Doehler Die Casting Company, of Brooklyn, New York, a corporation of New York.

This invention relates to casting apparatus and more particularly to the type thereof in which the mold cavities are formed in a plastic composition mold, this apparatus being particularly adapted for use in the production of what are known as "finished" castings. In the production of finished castings, it is essential not only to secure accuracy in the dimensions of the castings produced, but to have the finish of the castings smooth and the dimensions thereof uniform in all castings made. Such castings ordinarily are made in large numbers, and when drawn from the mold require little or no machine finishing excepting that incidental to the removal of the sprue and sometimes the drilling of holes. By the improved apparatus, as shown in cut, it is possible to guard against the presence of fins at the parting between the mold parts when two part molds are used, and to provide for the production of a plurality of castings in a single mold with uniform accuracy and ease of manipulation.



1,300,058. April 8, 1919. **Alloy.** C. Van Amburgh, Tacoma, Washington.

The primary object of the invention is the provision of a metallic alloy and the process of making the same whereby there is provided a metal possessing a minimum coefficient of shrinkage and expansion.

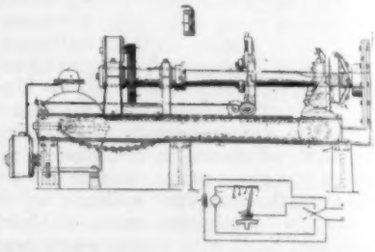
The alloy consists of the following component parts:—aluminum bronze 16%, copper 1%, silicon copper 3% and pure aluminum 80%.

The aluminum bronze herein designated is formed of copper 8.6%, aluminum 89% and tin 2.4% while the silicon copper is formed of 90% copper and 10% silicon.

In the process of manufacture, the aluminum bronze and silicon copper are separately formed by melting *en masse* the respective elements thereof. The 16% of aluminum bronze and the 1% of copper are then melted together and when in a molten state, the 3% of silicon copper is added to the batch which becomes melted thereby and enters into the constituency of the product.

1,301,221. April 22, 1919. **Method for Drawing Rods and Tubes of Varying Diameters.** L. H. Brinkman, Glen Ridge, N. J.

One object of the invention is to provide methods, as shown in cut, for drawing a tube of varying diameters without necessitating the use of a mandrel or inside support, the tube, however, accurately holding its predetermined form.

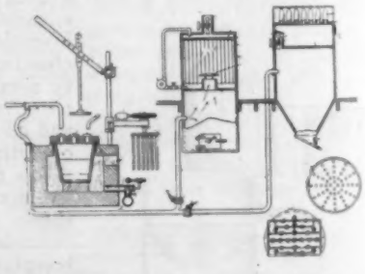


The patent covers: The method of forming a metal tube of different diameters, which consists in drawing heated metal through a pass, varying the diameter of the pass, chilling the metal immediately after being acted upon in said pass sufficiently for it to retain its shape, and meanwhile relatively rotating the tube and pass.

The method of forming a metal rod or tube having different diameters, which consists in drawing the metal through a pass and varying the diameter of the pass during such drawing in predetermined relation to the longitudinal movement of the metal through the pass.

1,301,374. April 22, 1919. **Apparatus for recovering metal from scrap material.** J. W. Brown, Lakewood, Ohio.

This invention relates to apparatus for carrying out a process disclosed in a companion application filed August 5, 1914. Serial No. 851,058, which process relates to the recovery of metals from scrap material, such as borings, filings, turnings, clippings, punchings, and sawings, of the metal or metals which it is sought to recover.



Generally speaking, the invention comprises the elements and combinations thereof set forth in the accompanying claims.

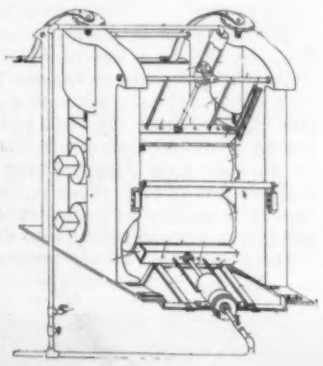
An apparatus, as shown in cut, for recovery of metal from scrap material comprising a melting pot, means for heating said pot, a stirring device associated with the pot, a conduit adapted to be maintained under suction, and a fume arrester comprising two chambers divided by a partition, but communicating through an opening therein, one of said chambers receiving heavier particles, and means in the other chamber affording a large surface of contact between fumes and a condensing liquid.

Apparatus for the recovery of a metal from scrap metal comprising a melting pot, means for heating the said pot, a suction conduit, means for connecting the suction conduit

with the interior of a melting pot, a fume arrester, and a separator connected with said suction conduit, and valves controlling the connection of the suction conduit with the said fume arrester and separator.

1,301,440. April 22, 1910. **Polishing Apparatus for Tin or Sheet Mills.** S. Hitchings, South Pasadena, Cal.

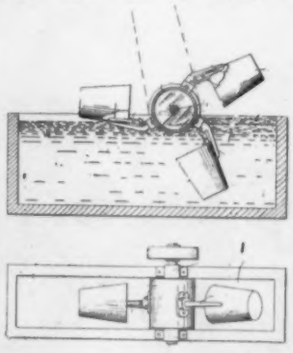
The object of this invention is to make a polishing apparatus for tin or sheet mills. The apparatus shown in the cut is covered by the following claim:



The combination with a frame and a sheet mill roll, of guideways secured to the inner face of the frame, a supporting bar mounted in the frame at the opposite ends of the guideways from the roll, a polisher holder mounted with its ends in the guideways, a polisher in the polisher holder and adapted to engage the roll, a piston cylinder mounted upon the supporting bar, a piston in the piston cylinder, a piston rod connecting the piston to the polisher holder, means for supplying fluid pressure to the cylinder to advance the polisher holder, and means for withdrawing the polisher holder a sufficient distance to allow of the operation of the roll and the passage of sheets forwardly over the roll.

1,301,590. April 22, 1919. **Galvanizing Apparatus.** J. P. O'Donnell, Providence, R. I.

This invention relates to an apparatus for applying a protecting coating to metal articles such as buckets or the like, and has for its object to provide such an apparatus, as shown in cut, that is simple and inexpensive in construction and effective in its operation and that is adapted to engage and immerse articles such as metal pails into a bath of galvanizing or other similar molten material so as to coat the articles both on the inside and outside evenly and uniformly and to carry the articles through the bath without permitting them to contact with any adjacent objects.



1,301,633. April 22, 1919. **Process of Soldering Aluminum.** Armand Henri Alexandre, of Levallois-Perret, France, assignor to Societe E. H. Moll & Cie, of Paris, France.

This invention relates to a process of soldering whereby there is obtained a joint of very high resistance so that pieces of aluminum soldered or brazed by the process exhibit great resistance both to bending and drawing, and may be hammered and worked without rupture of the joint.

The solder for use in this invention may be prepared as follows:

There are melted together in a crucible of suitable capacity, 55 parts of tin and 45 parts of zinc. When fusion is complete there are added 2.5 grams of stearin per 100 grams of the tin-zinc solder, which facilitates the separation of impurities, which come to the surface and are removed by skimming. The stearin eventually evaporates.

The fused mixture is heated to a suitable temperature and stirred so as to make it as homogenous as possible. When this condition has been attained the molten mass is cast into the form of sticks of suitable size in respect of cross section and length.

The proportion of zinc to tin in the mixture may be modified, accordingly as it is desired to make a solder more or less soft. For example, the proportion of zinc may be increased and that of tin decreased until there are equal weights of zinc and tin.

1,301,688. April 22, 1919. **Soldering Alloy.** Louis J. Gurevich and Raymond W. Woodward, of Washington, District of Columbia.

The object of this invention is to provide new alloys to replace the ordinary tin-lead solders at present in use, in order to conserve the tin supply of the United States, and also to provide an inexpensive solder which will securely join together such metals as tin plate, terne plate galvanized iron, copper, brass and like metals.

It is another object of this invention to provide a solder which may be used in the manner of ordinary tin-lead solder, and which in its application to the metal parts will stick or adhere thereto.

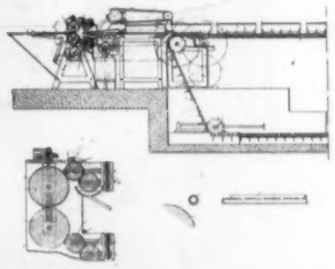
The improved solders consist essentially of lead and cadmium. Tin, in small quantities, considerably improves the compositions, but is not absolutely necessary.

The composition which is prepared comprises the following ingredients in the proportions specified:

Lead	80 per cent.
Cadmium	10 per cent.
Tin	10 per cent.

1,302,106. April 29, 1919. **Apparatus for Plating Metals.** William Ewart Watkins, of New York, N. Y., assignor to the Metals Plating Company, of New York, N. Y., a corporation of New Jersey.

It is the object of the present invention to provide an apparatus for coating metal, and more particularly sheet metal, such as iron or steel, with a protective plating of metal, such as copper, firmly adherent to the underlying metal, free from blemishes, unoxidized and permanent, homogenous and uniform.

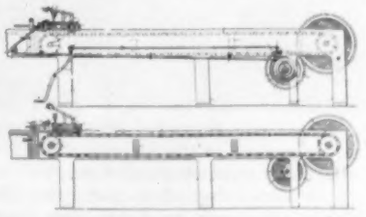


The invention comprises primarily a machine, as shown in cut, whereby sheets of elastic metal, such as iron or steel, may be coated on one or preferably on both sides, with a viscous metal-plating mixture or composition. This coating is of such a character that, on subsequent heat treatment, under proper conditions, it will yield a permanent non-stripping, firmly adherent metal plating on the underlying metal.

The invention also comprises mechanism for bending or curving the sheets of elastic metal before heat treatment, so that each assumes an arched shape, and for advancing or transferring the arched sheets toward the furnace, and for delivering them, properly timed, to the conveyor by which they are to be transported to the furnace for heat treatment.

1,302,599. May 6, 1919. **Seamless-Tube-Drawing Bench.** E. C. Sevigny, Jacksonville, Florida.

The invention relates to benches and more particularly to benches used for drawing seamless tubes. Benches in use, at the present time, require at least two operators to operate the same. It is one of the objects of the present invention to provide a bench as shown in cut, wherein the number of operators may be reduced to a minimum, in fact a bench that can be operated by one man.



A further object of the invention is to provide a tube drawing bench, wherein the tube is grasped by a clamping member at the die, then drawn through a die by a movable clamping member to any desired length, also to provide means whereby the movable clamping member may be returned to its initial position at any desired time.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

USING HYTEMPITE FOR OPEN FLAME MELTING FURNACES

In laying up the linings of the battery of Schwartz furnaces shown in the illustration, a combination of carborundum fire sand 5 parts, fire clay 1 part, "Hytempite" 1 quart, was used.

These furnaces show part of a total installation of 18 furnaces of the same type installed at the plant of the Rome Manufacturing Company, Rome, N. Y.

They were operated three years without re-lining and it is stated by the superintendent "that the linings are as good today as at the time the furnaces were started."*

In laying up these linings their method was first to mix sand and fire clay thoroughly in proportions of 5 to 1 and put through a No. 4 sieve. Then add the "Hytempite" working the mixture thoroughly with the sand in the same manner as kneading bread. Much depended on a thorough mixing. This mixture can be applied to the furnace while hot, if necessary, though the best results were obtained when the furnace was cold.

It is stated that after once being lined up all that was necessary was to touch up the furnace lining once a week where any weak spot developed.

This same mixture was also used on heating and annealing furnaces with very satisfactory results. Hytempite is manufactured by The Quigley Furnace Specialties Company, 29 Cortlandt street, New York, from whom full information can be had.

*W. J. Reardon in THE METAL INDUSTRY, February, 1919, page 63.

THE EAU CLAIRE SAND AND GRAVEL COMPANY

The new plant of the above company is located at Eau Claire, Wis., on the main line of the Chicago, Milwaukee & St. Paul Railroad. The company has one Williams portable crane mounted on a self-propelling truck with a one-half yard bucket which handles the sand from the bank and dumps it into a hopper on the bottom of the incline. From this point it is conveyed to the top of the bins on a 20-inch, 5-ply conveyor belt where it passes through two screens which separate the sand, gravel and stone. The stone and gravel is thoroughly washed while being separated and before being deposited into the concrete storage bins.

The sand is then carried in structural stationary steel chutes to six classifiers: two three spigots and four one spigot Richards hindered settling classifiers furnished by Allis Chalmers Manufacturing Company, Milwaukee, Wis., where it is thoroughly washed and classified into three grades, No. 20, 30 and 40 mesh, and then deposited into concrete bins.

They have one 25 H.P. motor 3 Ph. 60 Cyl. 1,140 R.P.M. to run the belt conveyer and one 35 H.P. motor 3 Ph. 60 Cyl. 1,140 R.P.M. to run pump which furnishes 750 gallons per minute from an open well 16 x 24 feet deep. This pump and motor elevates the water to a galvanized tank on top of bins 80 feet high from base of bins. Waste water is returned through wooden flume boxes where it leaks away through the ground.

The company owns 100 acres of land with a 48-foot bank face

A BATTERY OF SCHWARTZ METAL MELTING FURNACES AT THE PLANT OF THE ROME MANUFACTURING COMPANY, ROME, N. Y. THESE FURNACES HAVE A LINING LAID UP WITH "HYTEMPITE."

of red flint sand blast sand, roofing gravel and stone for concrete.

The No. 40 grade of sand is the one usually recommended for core sand.

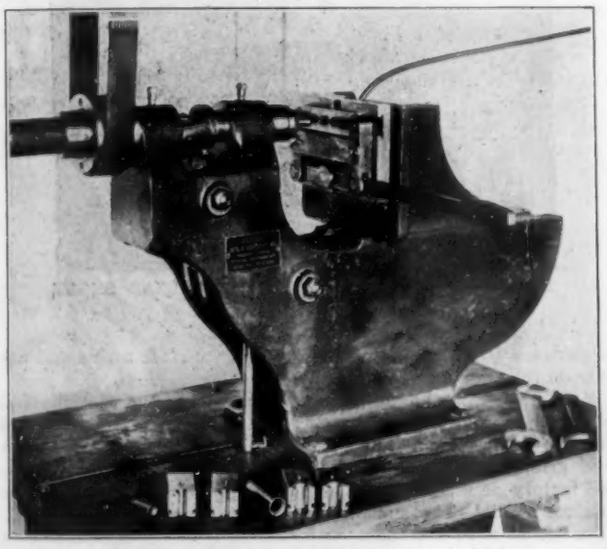
The officers of the company are: F. E. Nicoles, president; C. L. Tolles, vice-president; G. W. Robertson, secretary and treasurer, and the eastern representative is the Bridgeport Sand & Coal Company, Detroit, Mich.

A quantitative chemical analysis of the sand is as follows:

Loss on ignition	.37
Silica	88.79
Iron oxide and alumina	9.67
Calcium oxide	.88
Magnesium oxide	.29
Total	100.00

GRANT TUBE-END SPINNING MACHINE

The Grant Manufacturing and Machine Company, Bridgeport, Conn., has developed and placed on the market a spinning machine, intended for flanging the ends of brass and copper tubing, such as used for connecting brass or copper pipes to carbureters and oilers for automobiles, aircraft engines, motor boats, or copper coils for hot-water heaters. A quick hand-clamping arrangement is attached to the table or knee of the machine for holding the tubing securely in position while the flanging is being done. This clamping arranging is so designed



GRANT TUBE-END SPINNING MACHINE.

that the gripping jaws can be removed and others inserted for different sizes of tubing.

The machine will flange tubing from the smallest up to and including 1 in. in diameter, and the output from the machine will depend entirely upon the operator, as it requires only a second's time to form a perfect flange on the end of the tubing.

It will also be noted from the illustration shown that the machine is mounted upon a bench in a horizontal position which will permit the flanging of pipes of any desired length. The flanging is done through the medium of a foot treadle, thus leaving the operator's hands free to manipulate the work. The machines are arranged for either belt or motor drive.

KINITE

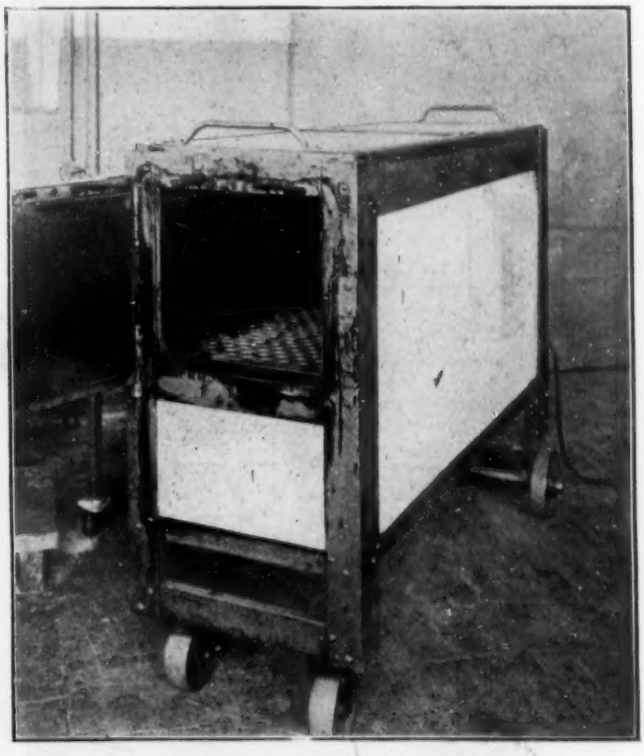
"Kinite, A Patented Alloy Steel" is the title of a new 4-page 8½-inch x 11-inch descriptive folder being distributed by The Kinite Company of Milwaukee. This new steel is especially adapted for making cutters, dies, taps and other tools with multiple cutting edges. Unlike other tool steels, Kinite is cast and not forged. It has the appearance, however, of a good smooth forging and also has a peculiar property in that it does not elongate under tensile strain nor decrease in cross-sectional area. Castings made from it do not change shape nor form in the hardening process, hence, it is possible to make a casting so near the desired shape and size of the finished tool that very little machining or labor is necessary to complete it. This characteristic of not shrinking, makes it a valuable metal for moulds for casting hot substances such as glass and metals that melt at or below 1,600 degrees Fahr. These substances usually contract on cooling and do not adhere to the Kinite mould, since it does not change shape or dimensions with changes in temperature. The booklet calls attention to the other properties of this new tool steel and contains illustrations of several large dies, one of them being a multiple die, which while working at a temperature of 550 degrees Fahr., has punched and formed about 4,000,000 pieces. To have made this die from ordinary tool steel, many parts would have to be lapped and ground together, whereas with Kinite, the complete die was cast in a single piece.

THE PORTABLE ELECTRIC OVEN

Many concerns have small pieces of work completed in different parts of their factory which have to be dried, japanned or enamelled before going on to the next stage of manufacture or assembly. Where production is small these pieces are usually taken to a special department, treated and then put back into the cycle of manufacture. This necessitates extra carting and hauling, loss of time and is inconvenient. In other words, it is not an efficient or scientific method of handling the work.

The photograph shows a portable electrically heated oven used for japanning small parts at the Philadelphia Switch Factory, Philadelphia, Pa., installed by the General Electric Company, Schenectady, N. Y.

The oven is 1 foot 6 inches wide, 1 foot 6 inches high and 5 feet long, with a heating chamber 10 inches high underneath the



A PORTABLE ELECTRIC JAPANNING OVEN.

floor of the oven. General Electric heaters totalling 4.72 KW. are installed in this heating chamber, and are controlled by means of snap switches so that four heats are obtainable, drawing 4.72, 3.94, 3.37 and 2.95 KW. respectively. The heating equipment, in this case, is designed for operation on a direct current circuit at 250 volts.

This oven is provided with ventilation so that it is adaptable to japan baking and enamelling. It is sometimes used for impregnating small coils with waterproofing and insulating material.

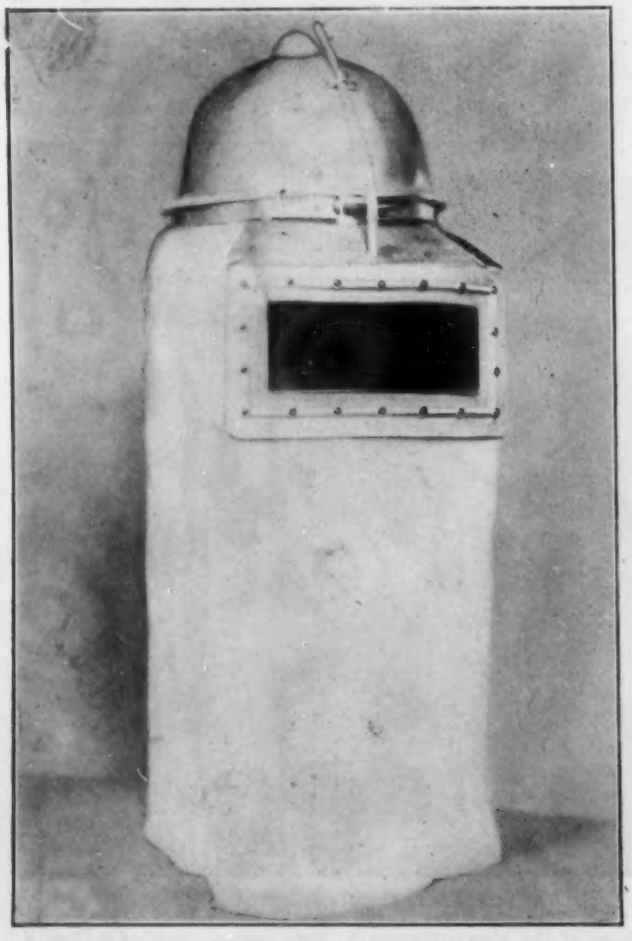
The portability of this oven has time and again proved to be a great convenience and saving. One man can easily push it around from one room to another, and elevators make it equally useful on any floor in the building. When in use, it can easily be placed in the most convenient location for the workmen and when not in use, it can be pushed back out of the way.

It is, of course, conceivable that gas, oil or steam could be used to heat this oven, but it is not practical. The difference between connecting up gas or steam pipes, carrying tanks of oil and compressed air along with the oven and merely connecting up the oven by means of a set of electric wires is obvious. Electric current is used in practically every manufacturing plant in the country, whereas, the same statement can hardly be made of other sources of heat.

SANITARY SAND BLAST HELMET

A new sand blast helmet that is worthy of particular mention is the one shown in the photograph manufactured by J. A. Spangler, of Benton Harbor, Mich. As is claimed by the manufacturer this helmet is strictly sanitary because of its construction throughout of non-rusting material. It is made of aluminum upon which the sand has no corrosive or destructive action and the helmet is correspondingly light in weight. It may be scalded with hot water or steam after the days work is over which makes it clean and pure for subsequent use.

Another important feature of this helmet is the fact that

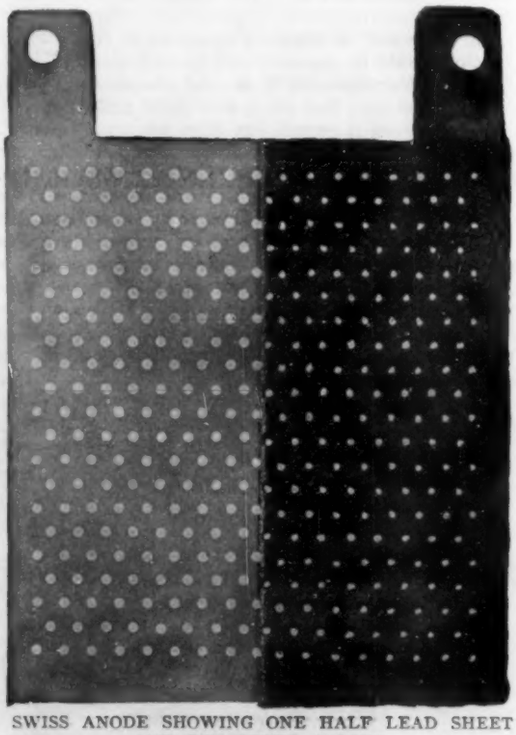


A SANITARY SAND BLAST HELMET.

the vision opening is so constructed as to allow the operator clear view of his work at all times. The following instructions are given for making repairs to the helmet. First, release the screw that passes through the ends of the clamping band, then remove the screws which hold the front plate in position. By doing this the curtain or screen may be renewed in a few minutes.

SWISS COPPER ANODES

A new development in the production of anodes for use in copper plating is evidenced in the anode now being furnished by the Boissier Electric Company of New York. These anodes are stated to be 99.99 per cent. pure copper and as shown in the photograph are made by depositing copper out of a solution carrying it on to a lead starting sheet. It is stated that the holes shown in the anode aid the electrolytic action by allowing the electrolyte



SWISS ANODE SHOWING ONE HALF LEAD SHEET AND THE OTHER COPPER.

to circulate freely, thus making the whole surface active and not only on the edge as is the case in the old style anode.

With the Swiss anode, the manufacturer states that the full surface is always available until all the copper is consumed and there is no irregular stub left which has to be scrapped. The lead grid, after the copper has been absorbed is returnable to the factory at the full price per pound which was paid for the original anode. The standard sizes of these anodes are 8 x 12, 12 x 18, 12 x 24 and 12 x 36 inches and they are described in literature which is obtainable from the Boissier Electric Company.

ALUNDUM FOR POLISHING

The Norton Company of Worcester, Mass., say records of actual performances show what can be done with Alundum grain. The advantages to the user of Alundum grain for polishing are by no means theoretical. For every claim as to the superiority of this article there are actual figures, gathered from competitive tests with other abrasives. A few quotations will serve as convincing arguments:

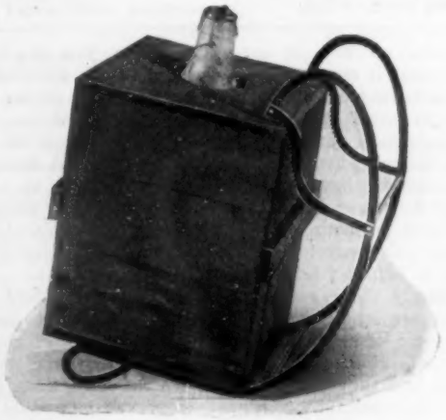
		No. Wheels Used	
Kind of Work: Large flat irons—	No. Pieces Polished	Alundum Grain	Competing Abrasive
No. 70 Alundum..	50 sides	1 with 1 coat	2 with 1 coat
	96 bottoms	1 with 2 coats	4 with 1 coat
	93 sides	1 with 2 coats	2 with 2 coats
Cast iron bracket— No. 90 Alundum..	200	1 with 1 coat	2 with 1 coat

Polishing bicycle sprockets is recognized as being an extremely hard operation on the wheel. The sharp edges tear ordinary abrasive away from the wheel.

JIFFY CARBOY ROCKER

As is shown in the cut the Jiffy carboy rocker is so simple in construction, while at the same time is strong, rigid and durable, that it supplies a great need as a factory convenience.

The slanting position of the carboy on the rocker while at rest allows the operator to start the tilting motion with the least possible effort.



THE "JIFFY" CARBOY ROCKER.

The teeth on the rocker provide a positive grip on the carboy so that it cannot become loose without the aid of the operator.

INSTRUCTIONS FOR FITTING ROCKER TO CARBOY

Place the rocker at the right hand of and close to the side of the carboy of acid, having the loop heel of the rocker toward the operator; operator to tilt carboy slightly toward him, putting the right foot on heel cross-bar of rocker, thus throwing the front

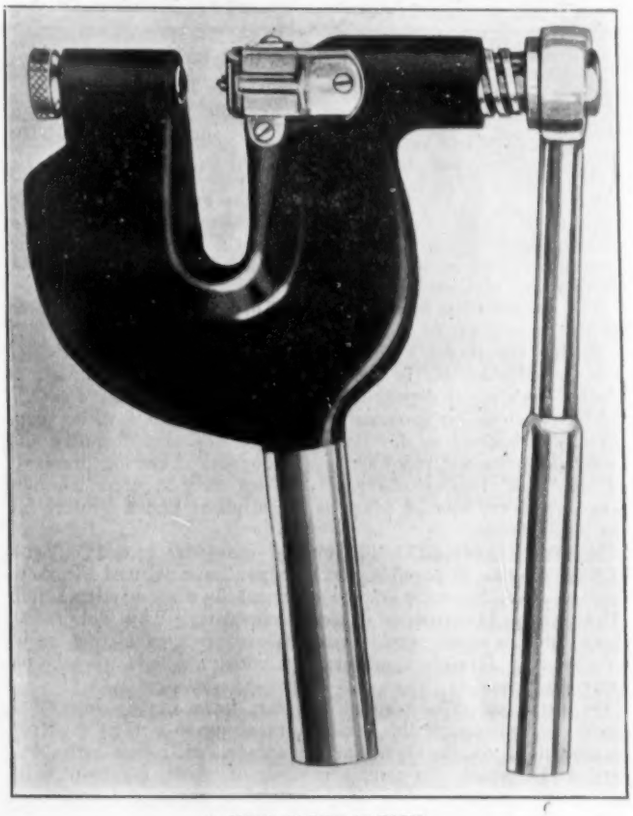
THE "JIFFY" STEEL CARBOY ROCKER (IN OPERATION).

part of rocker within close reach. Grasp rocker with right hand at second cross-bar from top, balance carboy with left hand on left hand corner of same; throw rocker over carboy with heel well under the bottom of carboy, then release hand from rocker and push carboy gently into place so that the teeth of rocker will firmly grip the upper edge of carboy. In order to become familiar with fitting rocker to carboy, it is suggested that this be first tried with an empty carboy.

This carboy rocker is furnished by the Hanson & Van Winkle Company of Newark, N. J.

NEW SPEED PUNCH

Paul W. Koch & Company, Chicago, Ill., has recently placed upon the market a new speed punch which is being sold under the name of "Jiffy." This punch, as shown in the cut, is powerful, compact, portable and speedy. Weighs 5 pounds and is 9½ inches long. The punch works in a small space and punches 5/32, 3/16, 7/32 and 1/4 inch holes in metal up to 10 gauge. Due to the deep throat and the one-piece automatic, disappearing stripper a clear view is afforded to the punch and the



A NEW SPEED PUNCH.

punch mark for the next operation. It is also possible to punch several sheets in one operation.

It is claimed by the manufacturers that because of the absence of the long clumsy handle the Jiffy punch can be operated all day long with a minimum of fatigue to the mechanic. The handle being in the center keeps the punch entirely upright; the dies and punches are more easily changed and the punch is easily clamped in a vise. There are no pipes to fit or adjustments to be made.

ZINC RUNNING BOARDS

Zinc is non-corrosive and takes a polish well. The higher quality metal, such as is required for making this part of the automobile, is easily handled, thereby reducing labor costs. In addition, it stands up admirably under constant strain and is durable.

For several months during the past winter tests were made with zinc by one of the leading manufacturers who specializes in running boards and such excellent results were attained that orders have been placed for large quantities of the metal. Economy, while an important factor, is declared to be not the only reason favoring the use of zinc.

After considerable experience in producing the desired quality, The New Jersey Zinc Company, New York, recommended to the purchasing manufacturer high grade zinc strips of certain weight and thickness as most suitable for making running boards.

ASSOCIATIONS AND SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

Copies of Speeches made at the recent banquet of the Grand Rapids Branch of the American Electroplaters' Society were received too late for publication in the May issue of THE METAL INDUSTRY. We take pleasure in reproducing them here.—Ed.

ELECTRO-PLATERS AT GRAND RAPIDS, MICH.

PRESIDENT WILLIAM FITZSIMONS

Gentlemen and Members of Grand Rapids Branch:

It affords me great pleasure to welcome you to the first annual banquet of the "Baby Branch"* of the American Electroplaters' Society.

We realize we are still in our infancy, and perhaps do not appreciate to the fullest extent as yet the possibilities which are open to us. The advantages to be obtained through the actual establishment of this city in the world of plating, and the continuance of friendship of the men comprising the International Society, are unlimited.

The organization here, while small in number, has endeavored to make itself felt in the electro-chemical field.

During the recent world crisis the platers of Grand Rapids contributed their bit in defeating the Hun, overcoming all of Uncle Sam's metal deposition problems with comparative ease.

The construction program of the local branch is being continually elaborated to the extent of receiving new members and establishing closer relations with the manufacturing interests of this city. During the past year we have secured ten new members, every one of which is a live plater and a booster for the organization.

In order to establish the plating industry in this city on as high a plane as possible, the members have secured the services of Prof. Kennedy of the chemical division of the Union High School, as instructor in electro-chemistry. This body meets three times a week regularly to discuss practical plating problems and to formulate modern analytical methods of solution determinations.

Our practical efforts along this line have greatly interested the manufacturers of this vicinity, resulting in a high spirit of co-operation, to the material advantage, of course, of both parties concerned. In fact, a number of them maintain well-equipped laboratories for pure chemical research and analytical electro-chemical problems.

The local members of the American Electroplaters' Society no doubt will remember this, the first annual banquet of the society in Grand Rapids, as one of the proudest moments of their lives.

In conclusion, I beg to express my gratification of the great efforts, not alone of the local members, but also the entire American Electroplaters' Society in continuing the admirable progressive work of electro-chemistry in its relation to our society.

***The news of the formation of the Pittsburgh Branch had evidently not yet reached Grand Rapids. Ed.**

EARNEST LAMOUREUX, CHICAGO, ILL.*

*Chicago office, A. P. Munning Company.

I am requested to say a few words to you upon the subject of the benefits of membership in our society. Much has been said bearing upon this matter, and it is always interesting.

There are many ways by which those of you who are eligible may benefit by membership; a few can be summarized as follows:

By the exchange of ideas and discussions that come up from time to time, reading of papers and general talks on plating problems at branch meetings and at the annual convention.

By the advancement and dissemination of any kowledge inspired by reason of having a membership in a society which is working along educational lines only.

By the personal contact with the men of your profession creating that spirit of goodfellowship so much to be desired and which carries with it encouragement from your fellow members, and who are always glad to aid you to solve your problems.

If we attempt to compare the period of progress in the field of electroplating previous to the advent of our society with that since the creation of our organization, you can begin to appreciate what it means to be privileged to be associated with the calibre of the men who form the great body of our society. Previously as some of you may know, the plater was isolated from his neighbor plater even if he was employed next door, and the tendency to avoid each other predominated, hence whatever advancement that may have been made was very limited indeed, and for the most part any information upon plating subjects was hard to obtain, if, in fact it was obtainable at all, due to the plater being enveloped in shells which were proof against all appeals to help his fellow plater.

Unfortunately there remain platers outside the fold of our society who are still under the illusion that to join our ranks and share their knowledge with us would entail a sacrifice. To such we can be charitable since we know the opportunities they are missing, and they will no doubt see the light some day.

Had the old conditions continued to prevail we would still be in the fog of ignorance regarding many phases of our craft, and the plating room of establishments doing such work would still be looked upon as a necessary evil, with the man in charge believing more or less all the bunk that might be passing around. Instead, we find that plating is more essential than ever before, first to make articles salable, and second, to make them durable, as a part of this the plater is coming into his own, and his counsel to his employer is invaluable.

We find also that when mysterious processes are advocated, they are immediately scrutinized by the foreman plater, and analyzed for their true value, and the interest of the employer is again adequately protected.

There can be no question but what we number in our membership by far the largest number of the really high class plater foremen in the country, the close contact and association with these men by the most of the membership or all the various branch societies and at national meetings, has served to educate and broaden the character and knowledge of all the members, and I defy any one to show a single instance where the more capable have suffered by passing around his fund of knowledge to the some what less capable. Instead, all these men today are recognized leaders and stand higher in their profession than ever before.

And let me say in passing that all new ideas and progress has not come from the most high. It remained for our own Jerry De Grazzio to expand a new idea of copper-plating direct on steel and iron from a sulphate copper solution, and who had ever heard of Jerry, obscure in the confines of Valparaiso, Ind., and now a national figure in the society?

I can perhaps best convey to you a better idea of our progress and the prestige the society now commands by citing an instance of the Great War when our Government, through the Bureau of Standards, called a conference at Washington to discuss various finishes and standards of tests for the Ordnance Department to which the officers and members of the society at large were invited, and who rendered a distinct service to their Government thereby, at a time of great need, can any one imagine for a moment that such a thing would have been possible under the old regime?

I want to point out another advantage of membership in our society. We number on our roster of our honorary membership the foremost professors in electro-chemistry in the country, and it is easy to appreciate what this means, since we have access to these men and through them to the laboratories where they are engaged.

Is it any wonder then that today when a manufacturer needs a foreman for his plating department, that he distinctly prefers a member of the American Electro-platers' Society? And where is there any concern who would not prefer members of our society in their employ with the tremendous fund of information back of every man on our roll as represented by the entire membership?

We do not conclude even under such conditions that those of you who are not with us are against us; instead, we extend the hand of fellowship and ask you to join us in the procession of progress and bid you a most hearty welcome to the advantages which a membership in our society affords.

St. Louis Branch—Meets third Saturday of each month at Barr Branch Library. H. H. Williams, 4158 Botanical Avenue, St. Louis, Mo., secretary.

The regular monthly meeting of the St. Louis branch was held at the Barr Branch Library on May 17. At this meeting one plater was elected to membership and four applications for memberships were referred to the Board of Managers. The officers of this branch for the ensuing year are H. Deubelbeis, president, C. L. Weygandt, vice-president, H. H. Williams, secretary and treasurer, G. Lamkemeyer, librarian; Board of Managers, E. J. Musick, G. S. Robins and H. J. Richards. Delegates appointed to attend the Philadelphia convention are E. J. Musick, H. H. Williams and H. J. Richards, with E. W. Heil, Sergeant F. C. Rushton and H. Deubelbeis as alternates.

An exhibition of an automatic signal was the feature of the evening and it brought out a great deal of discussion on time plating. Mr. Richards reported that he had been using one on his revolving cathode tank and found that the results were more work and a uniform deposit.

New York Branch.—Meets second and fourth Fridays of each month at 32 Union Square, Room 714, New York City, at 8 P. M. Secretary, William Fischer, 300 St. Anns avenue, New York City.

At the May meeting of the branch the following were elected to serve for the coming year: President, Mr. Sterling; vice-president, Mr. Minges; secretary-treasurer, Mr. Burke; recording secretary, Mr. Shubert; sergeant-at-arms, Mr. Masicot; librarian, Mr. Pflomm; trustees: Messrs. Haddow, Voss, Straub, Flanigan and Stuart. Delegates to the coming convention at Philadelphia, Pa., July 1, 2 and 3: Messrs. Haddow, Sterling and Fischer. Alternates, Minges, Burke and Shubert.

INSTITUTE OF METALS DIVISION

The Philadelphia local committee of the Institute of Metals Division for the convention to be held the week of September 29, was formed at a recent meeting of the Philadelphia Foundrymen's Association. Thomas Devlin, Thomas Devlin Manufacturing Company, president of the Philadelphia association, and Howard Evans, J. W. Paxson Company, secretary, are ex-officio members of this committee. The other members include G. H. Clamer, Ajax Metal Company, Philadelphia; C. R. Spare, American Manganese Bronze Company, Holmesburg, Pa.; H. W. Brown, Tabor Manufacturing Company, Philadelphia; Frank Krug, White & Bros., Inc., Philadelphia, and J. D. Hibbs, J. W. Paxson Company, Philadelphia. It is expected this committee will be considerably enlarged and its work organized through the medium of sub-committees a little later on.

Chairman William M. Corse has sent out the following notice:

"Our regular fall meeting will be held as usual this year in conjunction with the American Foundrymen's Association, during the week of September 29. The place selected is Philadelphia, Pa., and the exact dates of our meetings are September 30, October 1 and 2.

"The hotel situation in Philadelphia is particularly acute at the present time, so that it will be difficult to secure rooms in one hotel unless our members act promptly. We have selected the Ritz-Carlton Hotel at Broad and Walnut streets as headquarters and they have agreed to reserve twenty bedrooms each with two beds and bath at the rate of $8 per room per day for our members. This hotel is directly across the street from the Bellevue-Stratford Hotel which is the headquarters of the American Foundrymen's Association."

NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES

The fifth Annual National Exposition of Chemical Industries will this year be held in Chicago, Ill., at the Coliseum and First Regiment Armory during the week of September 22nd, and as usual there will be a number of society meetings held jointly with it. It is an encouraging sign that the American Institute of Mining and Metallurgical Engineers is among the number. We hope that this contact between the mining engineers with things chemical, chemists and chemical engineers will be to their increasing and mutual advantage. We know there is much that the mining engineers may gain from the Chemical Exposition, and without doubt they will leave behind something of value.

INSTITUTE OF METALS

The autumn meeting of the Institute of Metals will be held in Sheffield, England, on September 24 and 25. This meeting will be the first provincial gathering of the institute to be held since the war. The headquarters will be at the University of Sheffield. Members will be received by the Lord Mayor at the Town Hall, and there will be visits to works and other functions beside the ordinary business of the reading and discussion of metallurgical papers and reports. Those desirous of participating in the Sheffield meeting should communicate at once with Mr. Shaw Scott at 36 Victoria street, Westminster, London, England.

NATIONAL SOCIAL CONFERENCE

As we go to press the 46th annual meeting of the National Conference of Social Work is taking place at Atlantic City, New Jersey, June 1-8, 1919.

The predominant issue in the series of seventy meetings which are to be held is the problem of the wage earner. Labor and politics in the United States and abroad, and many other welfare problems will be debated by leaders from United States, England, Belgium, France and Russia.

NATIONAL BRASS MANUFACTURERS' ASSN.

Standardization of types in brass fixtures, practically absolute assurance that present prices will be maintained on finished products, and significance in the building activity now starting as an aid to more business for their products were outstanding features for consideration at the summer meeting of brass interests held in Cleveland, Ohio, May 15 and 16. Plans for the reduction of brass fixture numbers for household and building plumbing and hardware will be completed at the regular convention of the National Brass Manufacturers' Association to be held in Detroit, Mich., next September, according to predictions made by members attending the summer meeting in Cleveland this month. At the close of the session it was decided to support the decision to cut the number of varieties of plumbing fixtures alone from 4,000 types to 1,000 types, thus supplying a standard type for each variety of fixture. A committee will be appointed to work out the details between now and the regular convention dates.

The following was adopted as standard weight of Bibbs and Stops covered in Bulletin No. 283:

Size.	Plate.	Weight.	Size.	Plate.	Weight.
⅝	3000	16 oz.	½	3028	18 oz.
½	3001	14 oz.	⅝	3028	22 oz.
⅝	3001	17 oz.	½	3029	19 oz.
½	3005	14 oz.	⅝	3029	23 oz.
⅝	3005	17 oz.	½	3033	19 oz.
½	3006	15 oz.	⅝	3033	23 oz.
⅝	3006	18 oz.	½	3047	12 oz.
½	3008	12 oz.	⅝	3047	15 oz.
⅝	3008	15 oz.	⅜	3451	9 oz.
½	3014	15 oz.	½	3451	12 oz.
⅝	3014	18 oz.	⅝	3451	16 oz.
½	3019	17 oz.	¾	3451	21 oz.
⅝	3019	21 oz.	1	3451	32 oz.

The following resolution pertaining to freight shipments was adopted:

"No freight allowance will be made on shipments of less than 200 pounds, and when made to the jobbers' home address and freight *actually paid only* will be allowed upon return of paid freight bills with a maximum freight allowance of $1.50 cwt., the consignee to pay the war tax."

Appointed a Committee on Elimination, consisting of representatives from the following concerns:

H. Mueller Manufacturing Company, Decatur, Ill.
Hoffmann & Billings Mfg. Company, Milwaukee, Wis.
Milwaukee Brass Manufacturing Company, Milwaukee, Wis.
E. Stebbins Manufacturing Company, Springfield, Mass.
Glauber Brass Manufacturing Company, Cleveland, Ohio.
Pock Brothers & Company, New Haven, Conn.
Standard Sanitary Mfg. Company, Pittsburgh, Pa.

Reports received from various Committees as well as those of our members, indicated a very optimistic outlook for business in the future, many plants reporting they were quite busy, and a number stated that they proposed to manufacture goods and put them in stock in the firm belief that the man who has plenty of goods on hand ninety days or four months from now, will be the man who will fare well and make money rather than the man who is over anxious to dispose of his products, and bearing upon this situation is the upward tendency of copper and raw material market.

Of chief significance to the members meeting in Cleveland was the real activity in building operations in many parts of the country now already under way. While representatives east of Cleveland were not so optimistic, this view was offset by the reports of members coming from farther west. They reported special activity in the building of homes and as brassware represents 20 per cent of the cost of house building, it was the consensus of opinion among representatives that a vast increase in demand for the products will be seen within the next few months. Meanwhile, while no attempt to fix prices was gone into at this gathering, it was the firm belief of all present that there will be no recession from the 20 per cent increase in prices above normal effected by war-time conditions. Said William M. Webster, secretary, of Chicago:

"There have been so many liberal orders placed for all descriptions of hardware for housing and other purposes that there is much optimism for huge outlet for brassware during the coming summer months. In spite of the outlook for heavy demands, we cannot see any immediate reduction in prices. The question of labor's demands must be considered by this industry as well as others. The price increase lent our industry by war activities has not been as great as in other lines, consequently the margin of return is only fair."

While no action was taken regarding the policy of open shop for the members, in order to avoid disputes with labor, it is more than probable that some such decision will be reached at the September meeting. Since 75 per cent of the members already are operating on the open shop plan, it was freely predicted here that with but few dissenting votes the proposal will pass at the convention. About 100 delegates were present at this meeting. Headquarters were at Hotel Cleveland. Cleveland is represented on the standardization committee by A. J. Fischer, of the Glauber Brass Manufacturing Company. C. C. C.

PERSONALS

ITEMS OF INDIVIDUAL INTEREST

WILLIAM H. LEGATE

William H. Legate, the subject of this sketch, is no doubt well known to the readers of THE METAL INDUSTRY through his work in electro-plating. Mr. Legate was born in De Soto, Kan., moving from there to Denison, Tex., and finally settling in Hartford, Conn., the place of his present residence. He was educated at the Arsenal School in that city and started to work at the age of fourteen for his uncle, who owned the William Rogers Manufacturing Company.

WILLIAM H. LEGATE

Mr. Legate's grandmother was a Roger and a sister of the original Roger Brothers, the noted manufacturers of silverware. Mr. Legate made a specialty of learning the silver-plating business together with the etching of steel. He has had extensive experience in this line of work, and at different times has been connected with the Williams Brothers Manufacturing Company, of Naubuc, Conn., where he introduced the art of bright plating on silver, with the William Rogers Manufacturing Company, where he was in charge of the plating and buffing departments.

After a connection which lasted fifteen years with the last-mentioned firm he started a laboratory, but due to poor health he gave it up and installed a $10,000 plating plant for the Veeder Manufacturing Company. Finishing here he became connected with the H. C. Hart Manufacturing Company, of Unionville, Conn., manufacturers of knives with folding handles, and he has been with them for the past five and half years.

Mr. Legate has now formulated plans for going into a similar line of business, and the William H. Legate Manufacturing Company has been incorporated for this purpose. The company will manufacture a line of cutlery with hollow and folding handles, which will be made in both sterling and nickel silver and in steel. A full line of tableware will be manufactured in all designs. It is stated that the knife blades of this company's product will be hardened by a secret process and will be sharpened with a charcoal finish. A special feature of the product of the Legate Manufacturing Company will be a line that can be produced so cheaply that they can be handled by the five-and-ten-cent stores.

John McManus, polisher and assistant plater with the Spiro Manufacturing Company of New York, has been made foreman of the plating department of that company to succeed his brother, Joseph McManus, who died on March 27, 1919.

George P. Butler, formerly with the Dominion Chain Company at Niagara Falls, Canada, has started in business for himself under the firm name of the **Metals Finishing Company** at 486 Barton street, Hamilton, Ont., Canada. The company will specialize in japanning, enameling, lacquering and refinishing of automobiles, etc. Associated with Mr. Butler is Allan J. Butler and John Sherring.

Frank J. Tone, past president of the American Electrochemical Society, has been made president of the Carborundum Company, Niagara Falls, N. Y., succeeding the late **Frank W. Haskell. George R. Rayner** succeeds **R. B. Mellon** as vice-president and **F. H. Manley** retains the office of treasurer.

W. H. Weber, formerly experimental engineer with the Zenith Carburetor Company, has resigned his position and has become connected with the Claudel Carburetors, of Detroit, as sales engineer to introduce the Claudel Carburetor in the United States.

DEATH

We regret to learn of the recent death of **Emmanuel Blassett, Jr.,** of E. Blassett & Company, Burlington, Vt. Mr. Blassett will be remembered by the readers of THE METAL INDUSTRY by his numerous articles on electro-plating subjects, the most prominent ones being "The Silvering of Mirrors" which appeared in the December, 1913 issue of THE METAL INDUSTRY **and** "Rust-Proofing Iron and Steel Articles" which appeared in the January, 1914 issue.

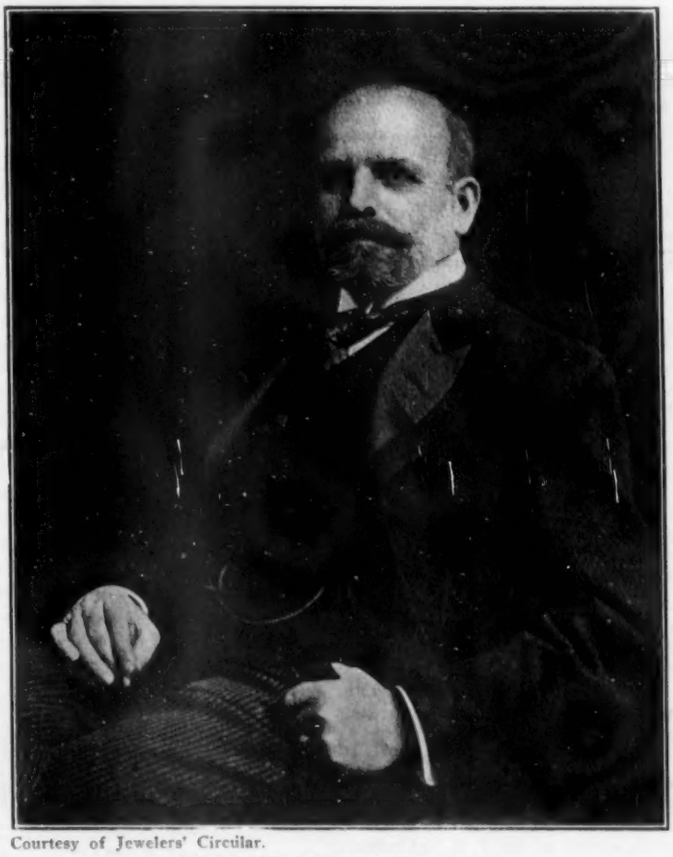
DEATHS

EDWARD HOLBROOK

Edward Holbrook, president of the Gorham Manufacturing Company, died at his summer home at Strawberry Hill, Conn., on May 19, 1919. Mr. Holbrook as president of the Gorham Manufacturing Company, as well as president of The Silversmiths Company (the holding corporation of a large number of manufacturing silverware concerns of this country), had for more than a quarter of a century been the leader and dominant influence in the silverware industry of America.

He had been in failing health since early in January, but the announcement of his death was unexpected as the seriousness of his condition was not generally known beyond the members of his family, business associates, and immediate circle of friends.

Mr. Holbrook was a native of Massachusetts, was born in the town of Bellingham, on June 7, 1849, and was the son of Eliab and Julia F. (Morse) Holbrook. His early education was obtained through the medium of the old-time district schools of that day. After the limited preparation afforded by the somewhat meagre curriculum the boy decided to learn the jewelry business. He proceeded to Boston and before he was 17 years old had taken his first position which was with the firm of Bigelow Brothers & Kennard (now Bigelow, Kennard & Company), the largest retail jewelers in that city.



Courtesy of Jewelers' Circular.

THE LATE EDWARD HOLBROOK.

In 1876, when Caleb Cushing Adams relinquished the management of the New York branch of the Gorham Manufacturing Company, Mr. Holbrook, although only 27 years of age, was elected as agent and in 1882 became a director of the corporation. It was under his regime as New York agent that the Gorham Manufacturing Company made its greatest advancement in the development of the silversmithing industry and his business associates of later years do not hesitate in saying that had it not been for him the Gorham Manufacturing Company would not have advanced from the position of being one of many concerns, to that of one of the largest and most important leaders in the silverware manufacturing trade, not only of this country but of the entire world.

A few years later, on May 4, 1888, he was elected treasurer and in 1894, when the late William H. Crins resigned as president after 15 years' incumbency, he was succeeded by Mr. Holbrook, who retained the office until his death. His only other predecessor in this office was the late John Gorham. On December 1, 1918, Mr. Holbrook relinquished the office of treasurer being succeeded therein by Alfred K. Potter.

Mr. Holbrook married February 18, 1874,, Miss Francis Swift, who with two children, John S. Holbrook of Providence and Madame Lilian de Balincourt, of Paris, France, survive him. John S. Holbrook, who will probably succeed his father as president, was elected director of the Gorham Manufacturing Company in 1905 and vice-president in 1906.

He was the first president of The Silversmiths Company of New York city and continued in the office from its organization, and was a director of all its subsidiaries. He was president and a director of the Maiden Lane Realty Company of New York, which erected The Silversmiths building extending from Maiden Lane to John street, wherein are located the down-town salesroom of the Gorham Manufacturing Company and the entire building is occupied by jewelry concerns. Here are also located the offices of the National Jewelers Board of Trade, the Jewelers 24-Karat Club and other jewelry interests.

He was also a director of the American Brass Company of Waterbury, Conn.; the Hanover National Bank of New York; the Massachusetts Mutual Life Insurance Company; Spaulding & Company, leading retail jewelers, Chicago; the Rhode Island Hospital Trust Company of Providence; the Hotel Biltmore and Hotel Commodore, both of New York city; the General Fire Extinguisher Company of Providence, and trustee of the Garfield Safe Deposit Company of New York and a director of a number of other concerns. He was also at various times connected with the Garfield National Bank of New York and the Merchants National Bank of New York. Besides his business interests, Mr. Holbrook was a member of many clubs.

EDWARD P. REICHHELM

Major Edward P. Reichhelm, of 90 West 34th street, Bayonne, N. J., died recently at his home. He was president of E. P. Reichhelm & Company, tool makers, 26 John street, New York, and was a veteran of the Civil War. He was born in Striegau, Prussia, Nov. 13, 1843, coming to his adopted country when he was 5 years old. After the Civil War he invented several tools which led in 1876 to the organization of the firm of E. P. Reichhelm & Co. In 1879 he invented a gas furnace for melting metals which laid the foundation for the incorporation of the American Gas Furnace Company, incorporated in 1887.

MAJOR E. P. REICHHELM.

TRADE NEWS

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS

WATERBURY, CONN.

JUNE 9, 1919.

When the factories start to lengthen their working days, is is a sure sign that they are doing more business, and such is now the case with many of the Waterbury manufacturing plants. Both the Benedict & Burnham and the Waterbury Brass branches of the American Brass Company started on a 10-hour-day schedule last week, and many of the other manufacturing plants have signified their intention of following in the same course in the near future, if they have not already done so.

General Superintendent John M. Goss of the Scovill Manufacturing Company, stated that business at the Scoville plants was resuming its pre-war condition and that employees in different departments throughout the factory were gradually being put on 10 hours a day, or a 55-hour-a-week schedule. The report that the Scovill Company had started on a big order of making Victrolas was denied by the superintendent. Other factory men claim that they can see a decided increase in business and predict a fine volume of trade in the immediate future. Many of the large manufacturing plants are now working on orders received rfom abroad and they continue to hire more help with each succeeding week.

Approximately 300 workers were engaged through the United States Employment Service alone during the week ending Saturday, May 24. Some of that total were sent to Bristol, to work in the plants of the New Departure and the Bristol Brass Company, etc. The special train to Bristol continues to carry a large number of workers each morning, and there are many New Haveners who are now residing in Waterbury and working in Bristol.—R. U. M.

NEW BRITAIN, CONN.

JUNE 9, 1919.

Conditions among the larger metal working industrial concerns have shown a decided improvement during the past month and while there is no such impetus to the business such as occurred during the early days of the war, there is, nevertheless, an undercurrent of optimism that was not in evidence three months ago. That there is a better tone to the metal working industrial market in this city is further reflected by the action of the P. & F. Corbin division of the American Hardware Corporation which had been working but 50 hours per week. This concern has now gone back to a 55-hour per week schedule and only the Russell & Erwin division remains on the 50-hour basis. This change has been necessitated by an increased business. Still another factor which indicates that business here is more brisk than in many other cities is the report of the labor situation. In this district, which includes New Britain and Bristol, there is no excess of labor, but on the other hand there is a very slight shortage of labor, according to the statements of the U. S. Employment Service.

At the New Britain Machine Company production of anti-aircraft gun mounts is being continued and shipments are being made almost daily. Machine screw products and other machine work is also being turned out in this plant and all this in addition to the concern's latest product—a small tractor for use on a small farm or garden. This tractor, which is new, is designed so that it can be operated by a single person and, in brief, takes the place of the horse on a plow, cultivator, harrowing machine, etc. The machine company intends to boost the manufacture of this production and a great future in this particular line is promised.

Landers, Frary & Clark, which has about finished up all its government work, is returning to its peace-time pursuits and has enormous quantities of back orders to fill for cutlery of all kinds as well as other domestic articles. Although this plant has greatly expanded during the past few years, yet another addition is about to be built at an estimated cost of $15,000.

Not only are the local concerns, which manufacture builders' hardware almost exclusively, making a strong bid for American trade, but they are also making a great effort to increase their foreign trade. The North & Judd Manufacturing Company is casting envious eyes far as Australia and is contemplating an establishment there to handle its goods. Then too, South America looks most promising to all New Britain Manufacturing concerns and an energetic effort is being made to increase the sale of their products throughout Latin-America.—H. R. J.

TORRINGTON, CONN.

JUNE 9, 1919.

W. P. Norton, for many years works manager of the Hendey Machine plant at Torrington, is designing a lathe and expects to start shortly in business for himself. Mr. Norton is the inventor of the famous Hendey-Norton lathe. He was connected with the Hendey Machine Company for 32 years, resigning about a year ago.

Torrington exceeded its quota by over quarter of a million dollars in the Victory Loan drive. The quota was $958,000 and the amount subscribed $1,552,750. Following are the factory figures for the drive, together with a comparison of the showing made by the factories in previous loan drives:

	Employes	No. Bonds	Amt.	Per Cap.
Warrenton Woolen Co.....	95	100	7,000	83.68
Torrington Creamery	17	17	1,250	73.53
Hotchkiss Bros. Co.....	80	50	4,600	57.50
Excelsior Laundry Co.....	22	10	1,100	50.00
Torrington Bldg. Co.....	44	25	1,900	43.18
Union Hardware Co.....	600	462	23,100	38.50
Torrington Mfg. Co.....	176	106	6,700	38.07
Hendey Machine Co.	750	424	27,000	36.00
Torrington Printing Co.....	20	6	600	30.00
Progressive Mfg. Co.....	120	26	3,050	25.45
Turner & Seymour Mfg. Co.	493	145	10,600	21.50
Standard Co.	725	200	13,500	17.24
American Brass Co.....	1703	268	26,750	15.71
Fitzgerald Mfg. Co.	140	42	2,200	15.71
Excelsior Needle Co.	1300	300	18,000	14.31
Schroeder Bros.	15	4	200	13.66
V LOAN TOTAL.....	6300	2185	148,150	23.50
IV LOAN TOTAL.....	7345	6513	391,400	53.28
III LOAN TOTAL.....	7653	5470	316,900	41.91
II LOAN TOTAL.....	7522	4770	290,300	38.59

Torrington held a big welcome parade Friday, May 16, in honor of the returning service men. Practically every factory in town was represented by one or more elaborate floats. The celebration lasted for two days, a general holiday being declared.

The Torrington office of the employment bureau is unable to fill all the demands for skilled factory workers, farm hands and women workers of every kind. No man or woman who really wants employment need remain idle these days, according to Superintendent Dunscomb Sanford, who is in charge of the office. There are three kinds of workers who may experience difficulty in securing employment in their particular lines, he told a Metal Industry representative. These are young unskilled factory hands, male office and store clerks, and chauffeurs. Applicants for jobs as chauffeurs are especially plentiful.

Lieutenant L. Cleveland Fuessenich, formerly of the Hendey Machine Company, is now stationed with the army of occupation at Mantabaur, Germany. He is with the military police, having secured a transfer to that branch of the service from the Yankee Division with which he went overseas. Lieutenant Fuessenich is a son of Frederick F. Fuessenich, former president of the Hendey Machine Company.—J. H. T.

PROVIDENCE, R. I.

JUNE 9, 1919.

As the first step toward starting a campaign in Rhode Island for the establishment of the straight eight-hour working day in all branches of the metal trades, a mass meeting was held about the middle of the past month, the Providence Metal Trades Council being sponsor for this meeting, which is to be followed by others.

Interest in the affiliation with the Metals Concil of unions of all crafts in the metal trades has been aroused to a high pitch by Richard Jennings, organizer, who has been making his headquarters in Providence for some time. He feels that the time is now ripe for metal trades craft workers to prepare for a demand for the eight-hour day, following in the footsteps of the textile employes.

In addition to the eight-hour working day there will be demanded a general readjustment of working conditions. It is the purpose to organize workers in all branches of the metal trades who have not already joined the ranks of the federation, to the end that, through affiliation with the Metal Trades Council, a new organization here, negotiations may be opened with the employers' association looking toward an amicable readjustment of conditions without the need of any more aggressive measures.

The United Wire and Supply Company is preparing to materially enlarge its plant on Elmwood avenue, Auburn, as soon as plans can be carried into effect. About a year ago the corporation first took possession of the new quarters where it was intended to concentrate all the three plants then being operated by the concern. The Providence plants were removed thereto but its plant at Pawtucket was continued because of Government war restrictions that precluded its being dismantled. The firm's plant at Auburn at present contains upwards of 90,000 square feet and the proposed addition will contain at least 17,000 square feet.

The company is engaged in the production of three distinct lines of goods—brass and copper tubings in the smaller sizes for all kinds of manufacturing purposes; seamless and plated wires for jewelers, optical and other requirements and automobile parts. They have large orders ahead in all of these departments and several large contracts are under consideration. The Pawtucket plant, because of its specially adapted equipment, has been continued in the production of tubing, large quantities of which were supplied on contracts and sub-contracts for Governments work, but this branch will be transferred to the Auburn plant as soon as the new addition is completed, when the Pawtucket property will be disposed of.

The Woonsocket Sheet Metal Works, 58 Allen street, Woonsocket, is owned by Jules W. Desrosiers, according to his statement filed with the city clerk's office.

V. E. Black Company, Inc., has been incorporated under the laws of Rhode Island to manufacture and deal in jewelry novelties, to be located in Providence. The incorporators are Samuel B. Levy, Victor E. Black and George Kollstede. The capital stock is $200,000, divided in shares of $100 each, of which 1,000 is common stock and 500 shares of first preferred and 500 shares of second preferred stock.

The Nickerson Art Metal Company of 8 Temple street, this city, are makers of the improved type of Ham & Durr chain machines, and also of automatic machinery of all kinds. R. S. Sanderson is the general manager, and the products of the company are of the sort to be in general demand in a city and an age when so much is done by machinery and the labor problems have forced inventors to supplant the human worker or supplement his work by machinery that will be self-operated as far as possible.

The Graham Manufacturing Company, manufacturers of small tools for jewelers' purposes, has begun the erection of a two-story brick manufacturing building on Willard avenue. It will be 43 x 100 feet and 30 feet high, of mill construction, with basement, all floors to be concrete.

A one-story brick addition is to be erected at the plant of the Frank Mossberg Company in Attleboro, so as to increase the size of the machine shop. It will be 60 x 140 feet.—W. H. M.

WORCESTER, MASS.

JUNE 9, 1919.

An indication of just how bright business conditions look in Worcester at the present time can best be gained probably by the statement that Worcester, with a full day and a half left before closing time, raised $11,500,000 for the Victory Loan, $217,000 more than the city's quota. Following the loan drive the city also made a good showing in the Salvation Army drive.

Most factories in the city report increases in business, though a number of the foundries are now somewhat handicapped by the strike of union molders. It is estimated that about 700 of the molders are out at the present time.

Worcester Machine Works has been incorporated and has a factory at 25 Bartlett street, this city. The capital stock is $50,000. Winfred S. Griffith is superintendent, Lewis M. Crittinger of Bloomfield, N. J., treasurer, and Edwin Churchill clerk. The corporation is to manufacture special machinery.

Jerome R. George, vice-president of the Morgan Construction Company, who has been in Europe since the first of the year in the interests of his company, has decided not to return to Worcester until after the peace treaty has been signed, which is expected about June 15. He is making his headquarters in London.

American Optical Company of Southbridge has been placed on new running time. The company started June 1 on a 48-hour-a-week schedule, for which the employes are to receive 50 hours pay. The workday, excepting Saturday, is to be from 7 a. m. to 11.50 a. m. and from 12.50 to 4.40 p. m. The quitting time on Saturday is to be 11.40 a. m.—W. J. B.

ROME, N. Y.

JUNE 9, 1919.

Business in the metal industry lines in Rome is looking up. During the month of May a new wire mill was born in this city. It will be known as the Halstead Wire Company, Inc., and will manufacture metal and alloy wires and cables. The Secretary of State has granted the new company a charter, and it will commence business with a capital of $50,000. The directors are J. P. Halstead and H. T. Dyett of Rome, and F. W. Wallace of Plainfield, N. J.

Mr. Halstead has been connected with the Rome Brass & Copper Company for several years, holding an important position. Mr. Dyett is president of the Rome Wire Company and has been successfully engaged in the wire making industry for many years. Mr. Wallace, it is understood here, is an experienced and efficient man in the wire manufacturing industry.

The new industry will be located for the present in the Fort Stanwix Knitting Company's building, 132-140 W. Front street, corner of South Washington street, and at the outset will manufacture special alloy wires in bronze, brass and other metals. Workmen have been engaged for some time installing the new company's machinery, some of which was purchased from the Babbit-Harris Company of Clayville, N. Y. A bright future is predicted for the Halstead Wire Company, as it will no doubt enjoy much of the success that has attended the several other wire mills in this city.

Another new Rome industry which has never been introduced to readers of THE METAL INDUSTRY is the Sterling Tool & Die Company, located at 130-136 South James street. The firm is composed of Charles E. Simpson, who is president and general manager; Harry J. Hayes, vice-president, and William J. Doyle, secretary and treasurer. The company manufactures special and automatic machinery, tools, dies and fixtures of all kinds. It does general machine work and maintains an up-to-date pattern department. Although it is considered one of Rome's new concerns, the Sterling Tool & Die Company has been in operation for more than a year. It has met with unusual success from its inception and has a bright future. The company occupies about 7,000 square feet of the building in which it is housed.

Each member of the Sterling Tool & Die Company is a practical mechanic. For twelve years Mr. Simpson was assistant chief inspector of the Savage Arms Company of Utica, and for several years was in charge of the housing and weld-

ing department of the Bossert Corporation, also of Utica, N. Y., makers of sheet metal stampings. Mr. Hayes is an expert machinist and toolmaker of several years standing. William J. Doyle is a veteran machinery and foundry man, and, although he has been constantly engaged in the metal manufcturing and foundry business in this city since 1879, he is apparently as active as he was 25 years ago. Mr. Doyle commands the highest respect of the business and manufacturing men of this community.

In addition to being connected with the Sterling Tool & Die Company, Mr. Doyle controls the Novelty Manufacturing Company of Rome (successors to the Rome Bronze Company), makers of all kinds of metal signs and tablets. He also operates, in connection with the Sterling Tool & Die Company and novelty company, a complete foundry, in which bronze, brass and aluminum castings, including carbureters, are produced. These concerns, one dove-tailing into the other, are doing a large and profitable jobbing business.—M. J. D.

MONTREAL, CANADA.

JUNE 9, 1919.

According to the general and most reliable opinion business is headed towards expansion. All of the Canadian industries are coming to life now, if they have not already done so. Foreign inquiries are coming in daily for prices and quotations on deliveries showing the after affects of munition manufacture and other war work.

The Montreal Metallurgical Association, which was founded in 1915 by Dr. A. Stanfield, met during the month of May at the Macdonald Chemistry Building of McGill University and elected the following officers for the ensuing year: G. P. Cole, president H. F. Roast, vice-president and Captain J. G. Ross, secretary. A council of members was also elected. The program for the coming year will include the reading of papers by experts on metals, foundry work and commercial problems covering metals and excursions to Metallurgical plants in Montreal and surrounding districts have been planned for the summer months. The association now has a membership of 254.

The Gillett Safety Razor Company, located on Alexander street, is very busy on export orders and is running to full capacity.

Labor conditions in the local brass manufacturing plants at the present time are not very good, employees having made demands on the employers for a 44 hour week instead of the 52 hour week they now have. They also want a substantial increase in wages.—P. W. B.

COLUMBUS, OHIO

JUNE 9, 1919.

The metal market in central Ohio territory is showing signs of awakening. While orders are not numerous and inquiries are only increasing to a small degree still purchasers are showing a disposition to talk metals and that is taken as a good indication. In fact the tone of the trade shows a distinct improvement all along the line.

Metal using concerns have no large stocks on hand and they have used up a greater part of the surplus which had been accumulated during the latter days of the war. Concerns are gradually using a larger quantity of metal as peace operations are becoming better. But in some lines business is slow in returning to normal. Generally speaking the market is showing more strength and everyone connected with the industry is more optimistic.

Type metals are the best feature of the trade in this territory. Prices are still low but some recent advances have been recorded. Copper and brass are still inactive. Aluminum is slightly improved. There is a better demand for zinc and tin. Spelter is also showing more strength.

The Alloy Parts Manufacturing Company of Canton has been chartered with a capital of $250,000 by P. Miller, H. M. Hiner, John F. Blake, G. A. Anderson and John T. Blake.

The B. J. Stamping Company of Toledo has been chartered with a capital of $10,000 by M. Siglow, T. Wooster, J. Bingham, Chester J. Hand and William L. Peters.

The Ohio Metal and Manufacturing Company of Dayton has been incorporated with a capital of $20,000 by Frank E. McBride, Carl J. Faulkner, Mrs. Harry D. Kalbfleisch, J. Faulkner and Ella G. Currigan.

The authorized capital of the Central Brass Manufacturing Company of Cleveland has been increased from $150,000 to $210,000.

The Standard Metal Goods Company of Cleveland has been incorporated with a capital of $10,000 by Harry T. Hamilton, W. W. Hoyt, A. L. Lang, E. J. Thomaben and Harry H. Rose.—J. W. L.

CLEVELAND, OHIO

JUNE 9, 1919.

To a Cleveland firm in the metal industry is believed to be due the credit of establishing the system of paying wages upon the cost-of-living basis. So successful has this plan been, since its establishment in 1917, that other business firms in other industries are trying it out. First adoption of the plan in this field has been by the George Worthington Company, hardware interests. According to W. D. Taylor, president, and A. J. Gaehr, secretary, of this firm, the employees understand that as the cost of living rises or falls, their pay rises and falls with it. The majority of the employees understand this and are disposed to welcome the plan. The arrangement of rise and fall in wages is based upon the prices for living commodities. Of course all wages are based upon the experience and ability of the worker, and the work he is performing.

Another plan, not quite as new, but as effective in producing maximum of efficiency and satisfaction among employers and employees, has been adopted by the Hiram Rivitz Company, plumbing, heating and factory metal products. The plan is known as the co-operative plan, employees sharing in the profits of the company. Real tryout of the scheme will be made when operations are under full headway in the new $500,000 building of this company. Occupancy of the new building is scheduled for March, 1920, at which time officers of the company will be selected from the heads of departments. Stock will be issued to employees, to be paid for on the installment plan, and the salaries of each employee will be augmented by bonuses and increases in salaries at the end of each year. The ultimate object is to assure a future for each employee through the owning of stock and the sharing in profits.

New construction in the Cleveland district indicates the further improvement of industry affecting the metal producers and handlers in this section. Another large outlet for parts and accessories is seen in the plans for a great plant for the Supreme Motors Company at Warren, Ohio, which is an addition to the smaller plant erected during the war. Plans of the Cleveland Tractor Company, announced during the month, call for the erection of a plant at Springfield, Illinois, to be built in the near future. According to reports from Chicago received here, the tractor interests have incorporated a $6,000,000 company in Illinois, $57,000 of the stock to be held in that state. No confirmation of this phase of operations has yet been made by Rollin H. White, president of the company. The Jordan Motor Company has awarded contracts for a new plant in the east end of this city, to cost $175,000, which will increase the present capacity 150 per cent. There will be five additional units in the new construction. Another opportunity for the industry, not only of this section, but in other parts of the country, is seen in the authorization by the War Department for a mammoth artillery storage depot at Port Clinton, Ohio, at a cost of $1,000,000. New industry for Cleveland is announced by the Cleveland Chamber of Commerce, in obtaining a location here for the Wheeler Radiator and Manufacturing Company, which has taken one and one-half acres for a factory site in the East Cleveland district. Employment to 500 persons will be given, it is announced. Backers of the enterprise are said to be from the English and Merrick Company, New Haven, Conn., which

firm has been manufacturing radiators for the last twelve years. Officers of the new company are: President, W. H. Ritter; vice president, D. E. Wheeler; superintendent, F. R. Kissling; treasurer, E. F. Hafflinger.

Damage to the extent of $3,000 was done at the plant of the Ferro Machine and Foundry Company when a compressed air tank blew up. Part of the building and machinery were damaged. No one was hurt.

Some indication of the business being done in certain branches of the industry may be seen in the announcement that the personal property return for the Cleveland Hardware Company made public by County Auditor Zangerle amounts to $3,266,000, the largest increase of any Cleveland firm over 1918. The return is more than twice as much as that made last year.

At a meeting held at Hotel Hollenden by the Lumen Bearing Company, Buffalo, eighty-five representatives of Cleveland firms heard addresses by experts on bearings. The principal speaker was C. H. Bierbaum, vice president of the company and chairman of the bearings committee of the American Society of Mechanical Engineers. Address also was made by W. H. Barr, president of the Lumen interests. Mr. Barr also is president of the American Foundrymen's Association.

Frank A. Scott, vice preisdent of the Warner and Swasey Company, has been awarded the distinguished service cross, according to information received here from the War Department. Mr. Scott was for six months chairman of the War Industries Board. The medal is in consideration of his efforts in co-ordinating war production. C. C. C.

DETROIT, MICH.

JUNE 9, 1919.

Detroit manufacturers and those in the metal trades in particular are beginning to realize that they are entering the greatest business era in the city's history. At the present time manufacturers find it hard to obtain the men they need to man their departments. The highest wage is paid, the greatest increase going to common laborers, who are drawing all the way from $4 to $5 a day. The Detroit plants are now open to any labor from the outside. Just an illustration as to labor prices in Detroit: Ice wagon drivers all over the city are paid $35 a week; at the Ford Motor Co. girls on the telephone switchboards are paid $36 a week for eight hours' work. Conditions similar to these are reported all over the city. When a man can draw $35 a week for driving an ice wagon he is going to demand a good deal more than that for labor in a hot brass foundry and he is getting it too.

The city is packed with people from all parts of the country who are living in a most inconvenient way, simply because they can find nothing better. An unheated flat that rented last winter for $48 a month has gone up to $60 and $70. Real estate of all kinds is turning from hand to hand in rapid fashion. One man will sell his place for a good profit and in a day or so the new owner turns it over at another thousand profit. And so it goes.

Building is progressing very slowly and people are now beginning to live in tents or filling up the summer cottages at the nearby lake resorts. Such conditions as these cannot help but effect the brass, copper and aluminum business as well as it does every other line. Where the end is going to be no one can even anticipate, but it is certain that Detroit is destined some time in the not distant future to make even Chicago stir itself.

The Wolverine Tube Company here has been purchased by a number of men who have been interested in this industry here for a long time. The new owners include Charles C. Limbocker, president, who for a long time has represented the A. H. Wells & Company, of Waterbury, Conn., in this territory; Harry J. Hooks, secretary-treasurer, for the last several years a representative of the United Wire & Supply Company, of Providence, R. I.; George R. Anthony, vice-president, formerly general manager of the Detroit plant of the American Radiator Company; William H. Sherman, formerly general superintendent of the United Wire & Supply Company, of Providence, R. I., has been made factory manager. The output of this company is used entirely by automobile manufacturers. A number of extensions will be made in order to meet the heavy demands for production.

E. S. Gellatly, general sales manager for the Illinois Zinc Company at Peru, Indiana, in an interview in Detroit a few days ago said that his company has experienced a wonderful increase of business here due to the fact that automobile companies are coming more and more to use this metal for parts of cars that are more or less exposed to the weather. He says it is now fully recognized as a metal of wonderful possibilities in drawing, spinning and stamping. Its non-corrosive characteristic makes it well adapted for automobile parts.

The airplane industry is coming more and more into prominence here. The Packard Motor Car Company already has placed an airplane on the market and several other manufacturers are planning to do the same thing. The tractor industry is developing even more rapidly. The Ford plant at Dearborn, a Detroit suburb, is reported manufacturing heavily, its output going to all parts of the world.

The shipbuilding companies in both Detroit and Saginaw, Mich., are engaged heavily on ocean-going vessels. Large contracts are under way that will require many months to complete. These ships are all well equipped with brass, copper and aluminum, which necessitates the ship building companies keeping their foundries going at full blast.

F. J. H.

LOUISVILLE, KY.

JUNE 9, 1919.

Business with the general copper and brass industry of Louisville continues good, with all shops busy, and many reports being made relative to shortage of labor.

The Belknap Hardware & Manufacturing Company, large jobbers of brass and copper-finished goods, has purchased at a price of about $500,000 almost an entire block on Main street, which will be remodeled as a new warehouse. This property takes in the famous old Galt House Hotel.

At the present time most of the local work is in connection with old war orders, special equipment for auto and ship manufacturers, etc., while there has also been an improvement in the demand for brass plumbing goods. The Louisville plant of the Standard Sanitary Manufacturing Company, large manufacturers of brass plumbing goods, enameled bath tubs, nickel-plated goods, etc., has been very busy for several months, although not as busy as during the war period. The company is now operating its own cafeteria, furnishing meals to all employees.

The Standard Milk Machinery Company, large consumers of brass and copper castings, and special parts, has recently increased its capital stock from $3,000 to $20,000. T. J. Hines, C. Mortensen and Margaret Hines are the incorporators.

The copper working plant of Matt J. Cochran & Son has been running at full capacity, principally on old orders for the Government. Matt Cochran, Jr., believes that prospects point toward good business.

The Standard Oil Company of Kentucky has announced that it will erect a new addition to its plant, costing $2,000,000, and to be started as soon as the final unit of the Louisville plant is in full operation. A considerable amount of lead and copper, as well as brass, will be required. The National Lead Company supplied a tremendous quantity of sheet, tube and other lead on the first plant. The Star Refining Company, of Detroit, Mich., has also been planning to locate at Louisville.

Hines & Ritchey report that they have been very busy, with such men as they could secure, making a considerable amount of stuff for the Standard Milk Machinery Company, and outside business.

Machine shops as a whole appear to be busy and are advertising for good machinists, die makers, lathe operators, grinders, shapers, tool makers, helpers, etc. Louisville during the war period enlarged manufacturing facilities materially, resulting in a larger demand for skilled labor than before the war.

The Independent Brass Works on Fifth street is managing to keep behind on orders all the time, as new business is coming faster than it can clean up old orders. Manager Rademaker feels that 1919 will prove a very good year as a whole, whether the country is dry or not.—O. V. N. S.

PHILADELPHIA, PA.

JUNE 9, 1919.

The metal trades generally in Philadelphia are rather quiet in volume of business, compared to the rush of war time necessity. Although not at full capacity, virtually all local concerns are fairly busy, and all are optimistic of the future.

Local dealers in raw metals report slow markets. The copper situation remains dull, with a slight increase in prices during the month of May. The lack of action in the market is attributed generally to the uncertain conditions relative to the peace treaty. With the signing of the treaty by Germany it is expected there will be some demand from abroad which will stimulate the general domestic situation. Well-informed men show no indication of fear for the future, and they express the belief that the present after-war lull in the market will not last long, and that a new buying wave is likely to come with an upward trend in prices.

Local men interested in tin are confident of an early clearing in the market atmosphere with the removal of restrictions on importations of ores and concentrates by the War Trade Board. It is understood this will occur on July 1, and it is further expected that price regulations on the domestic market will be removed soon thereafter.

In spite of general dull conditions in the metal trades, many Philadelphia concerns are less affected by this situation than by the shortage of suitable labor. Many shops which could use more help are able to get only a half or two-thirds of their usual force. Managers and foremen blame the shipyards of the Philadelphia district for this state of affairs.

They point to long rows of machines in their departments which stand idle not through lack of work, but on account of not enough workers. The great amount of shipbuilding in this neighborhood, which still continues at almost war intensity, except for the overtime and Sunday work, makes a situation that cannot be met by many lines of the metal industries, which must compete in their products with other localities where shipyards do not draw the bulk of the best labor. The eighty cents an hour rate paid by the shipyards to the ordinary skilled trades, and the higher prices paid to such lines as coppersmiths, cannot be equalled by shops doing a strictly commercial work not under Government control as the shipyards are.

Among those engaged in the various metal industries in the Philadelphia district who subscribed to the Victory Loan may be mentioned the following: Paul S. Reeves & Company, $20,000; Kutztown Foundry and Machine Company, $15,000; Stanley, Flagg & Company, $30,000; Hall & Carpenter, $10,000; White & Bro., Inc., and employes, $10,650; McFarland & Little, $12,000.

Bailey, Banks & Biddle, jewelers and silversmiths, will build a twelve-story factory at 1220-24 Sansom street. It will be 45 by 80 feet, of steel, brick and re-enforced concrete. The contract has been awarded to Irwin and Leighton, Twelfth and Cherry streets. P. M. Sax is the designing engineer.

Alterations will be made to the office and foundry building of E. E. Brown at McKean and Vandalia streets, to cost $1,500.

The William Cramp & Sons Ship and Engine Building Company, Beach and Ball streets, have started work on new coppersmith and blacksmith shops, to replace the structures destroyed by fire several months ago.

The Ajax Metal Company, 46 Richmond street, will make extensions and alterations to cost $3,000 in its shop on Allen street, near Front street.

Paul Heine, of Lancaster, Pa., will soon build a one story machine shop, 40 by 44 feet. The cost, including equipment, will be $30,000.

The Berroth-Pettit Corporation, Philadelphia, has been chartered to manufacture metal products and machinery at a capitalization of $5,000. Among the incorporators are H. Walter Berroth, 320 West Logan street, Philadelphia, and Samuel D. Pettit, Cranford, N. J.—G. B. G.

TRENTON, N. J.

JUNE 9, 1919.

Both the metal manufacturers of Trenton and their employes are keeping up their generosity when it comes to giving to drives and to Liberty Loans. The metal industries of this city alone purchased more than $700,000 worth of bonds of the Fifth Loan series. The exact figures were $645,050. The heaviest purchaser was the John A. Roebling, which concern and its employes bought $365,000 worth. The Westinghouse Lamp Company followed second with $75,000. The J. L. Mott Company bought $54,000 worth, and its employes $35,000. Other concerns and the amount they bought are as follows: Trenton Brass & Machine Company, $29,050; Jonathan Bartley Crucible Company, $5,000; Ingersoll-Trenton Watch Company, $14,000; De Laval Steam Turbine Company, $40,000; Trenton Smelting & Refining Company, $16,500; Mercer Automobile Company, $11,000. The Skillman Hardware Manufacturing Company and the Billingham Brass & Machine Company also subscribed liberally. The Trenton jewelers bought $1,000 worth. The manufacturers also gave generously to the Salvation Army drive.

Trenton metal manufacturers report that business is only normal at the present time, but this condition is not unusual at this time of the year. Now that pre-war conditions prevail this is to be expected. Junk dealers report that there is a good demand for brass and copper and other metals. There is little, if any, in the change of price.

The engraving business of Horace E. Fine, one of the oldest of its kind in the city, has been sold to the Sarco company. Mr. Fine, the founder of the business, retires after twenty-eight years in that line. The firm started with one small room and now occupies two buildings on East State street. At the start the company did jewelry engraving, and after enlarging the plant began to make embossed metal labels. Mr. Fine was the first one to make a medal for the city of Trenton. Gustaf B. Mellin, Edward W. Geoghegan and Miller M. Farr, who acquired an interest in the business a year ago, will continue to have charge of their departments. The company is now doing work for foreign countries. The new company is capitalized at $125,000.

Colonel Washington A. Roebling, head of the John A. Roebling's Sons Company, Trenton, N. J., on May 26 celebrated his eighty-second birthday. He is still hale and hearty and transacts business at his big plant daily. Because of the recent death of his brother, Charles G. Roebling, he did not celebrate on an extensive scale, a few relatives being entertained at dinner. Mr. Roebling won his military title for distinguished services during the Civil War. He first achieved distinction when, as a member of General McDowell's staff, he directed the construction of a suspension bridge, 1,200 feet long, for the transportation of troops over the Rappahannock. He has also written a number of books on scientific matters.

Howard Moore Company of Newark has been incorporated with $10,000 capital to manufacture metal goods. The incorporators are Joseph Mehr of Newark, Edward De Wyrall of Ridgefield Park and H. M. Hanson of Jersey City.

Metallic Gasket Company of New Brunswick, N. J., has been incorporated with $50,000 capital to deal in metal goods. The incorporators are Zeno Schultes, George Geipel and S. G. Geipel, all of New Brunswick.

The Metal Reduction Company of Newark has rented for a term of years the property at 120 and 122 Lillie street. The plant will be under the management of H. N. Schreuder.

The Art Metal Construction Company of Jamestown, N. Y., has leased a portion of the building at 34 Clinton street, Newark, N. J. After improvements have been made the building will be used for the sale and display of metal office furniture.

Star Foundry Company of Newark, N. J., has been incorporated with $100,000 capital to deal in hardware, etc. The incorporators are M. B. Patterson, J. J. Palitta and George Palitta, all of Newark.

Balbach Smelting & Refining Company has taken out a permit for the erection of a laboratory and rest room at Wilson and Doremus avenues, Newark.

New Land Lamp Company of Newark, N. J., has been incorporated with $100,000 capital to manufacture and deal in lamps. The incorporators are Nicholas Striglia, R. J. Farese and Michael Bonito, all of Newark.—C. A. L.

VERIFIED NEWS OF THE METAL INDUSTRY GATHERED FROM SCATTERED SOURCES

The Ohio Metal & Manufacturing Company, Dayton, Ohio, has been incorporated with $20,000 capital stock by Frank E. McBride and others.

The Reliable Stamping Company, 1400 Niagara Street, Buffalo, N. Y., manufacturers of aluminum rules, has filed plans for an addition to its plant at 9 Lafayette street. The building will be 35 x 90 feet and will cost about $20,000.

The American Zinc Products Company, Greencastle, Ind., is contemplating the installation of an electro-plating and chemical plant in connection with its present business of rolling sheet zinc.

Founded as the North Side Brass Foundry, Chicago, Ill., the **Hills-McCanna Company,** 153 West Kinzie street, has been taken over by A. H. Noyes and A. H. Smith. The company operates a brass, bronze and aluminum foundry, brass machine shop, tool and grinding room, and casting shop.

Charles A. Greene, Chicago, representative for **The Borden Company,** manufacturers of Beaver pipe tools, Warren, Ohio, has opened up a downtown office at Room 501, No. 549 West Washington Boulevard, Chicago, Ill. Mr. Greene can be reached promptly by mail or phone at his new headquarters.

George Ostendorf, formerly with the **Tropical Paint & Oil Company** of Cleveland, Ohio, has become associated with the sales department of the Hilo Varnish Corporation, Brooklyn, N. Y. Mr. Ostendorf will make his headquarters in Cleveland and will have charge of both the manufacturing and jobbing trade of northern Ohio.

The Apothecaries Hall Company, 18 Benedict street, Waterbury, Conn., has been appointed special agents for the state of Connecticut for the Matchless Metal Polish Company's full line of polishing and buffing compositions. To insure prompt delivery to their customers they will carry carload stocks of these products in their warehouse at Waterbury.

The Grand Rapids Brass Company, Grand Rapids, Mich., is erecting a new building 92 x100 feet, three stories, of brick and concrete construction. The company manufactures a line of hardware and operates a brass and bronze foundry, brass machine shop, tool and grinding room, spinning, stamping, galvanizing, tinning, brazing, soldering, plating, polishing, japanning and lacquering departments.

The Manitowoc Plating Works, Manitowoc, Wis., which recently broke ground for a new plant, has increased its capital stock from $15,000 to $35,000. The officers are: Walter J. Wachowitz, president and general manager; Stanley Buretta, vice-president and general superintendent; Edwin Butz, secretary and treasurer. The company specializes in plating aluminum and other casting by a new retinning process.

A. P. Munning & Company, manufacturers of electro-platers' supplies and apparatus, New York, on May 1, 1919, purchased the complete plant, assets, etc., of the Union Polish Company. The physical part of the plant, consisting of machinery, raw material, mixers, etc., has been moved to the main plant of the Munning Company at Matawan, N. J., where the manufacture of the material heretofore made by the Union Polish Company will be continued.

W. H. Dailey, receiver for the **Advance Machinery Company,** Van Wert, Ohio, announces that the plant is in much better condition than it was three months ago when he took it over and that the overhead expense has been greatly reduced without loss in production or efficiency. Mr. Dailey also reports that the company is running full time in all departments and that the balance is on the right side of the ledger.

A. C. Whitefield, sales manager of the **Napier Saw Works, Inc.,** Springfield, Mass., manufacturers of band saws and machines and hack saws, announces that all connections heretofore existing between the Napier Saw Works, Inc., and the A. Z. Boyd Company, who have been their representatives in New York, have been discontinued, and that business from the New York territory will hereafter be handled direct from the factory.

The Leyse Alumium Company, Kewaunee, Wis., has started work on the superstructure of its main factory building, 60 x 150 feet, two stories, of brick, concrete and steel, which will be used for the production of kitchen utensils and other drawn ware. The new shop will increase the capacity fourfold and it is expected to be ready for occupancy by September 1. The concern was formerly known as the Aluminum Sign Company.

The Thinsheet Metals Co., Waterbury, Conn., a new concern organized to manufacture radiator and shim brass, thin brass and copper, platers' metal, gilding, bronze and nickel silver, are about to start operation. They will make a specialty of metals from .010 to .001 thickness, 5/32″ to 8″ width, and will do rerolling for the trade.

The officers of the company are as follows: C. E. Billings, New Haven, Conn., president; W. B. Goodrich, New Haven, Conn., treasurer; H. T. Cross, vice-president, and Joseph Rigney, superintendent.

The Federal Brass Works, 362 Trombley avenue, Detroit, Mich., has changed its name to the Federal Bearing & Bushing Corporation, which is considered more appropriate, as the past three years the concern has specialized in the manufacture of babbitt-lined bronze back bearings and bronze bushings and will continue to manufacture these parts exclusively. Lloyd P. Jones is president; S. C. Reynolds, vice-president and treasurer, and F. C. Heath, secretary.

The E. W. Bliss Company, Adams and Plymouth streets, Brooklyn, N. Y., is having plans prepared for a machine shop and a foundry near its ordnance works, foot of Fifty-third street, to cost about $800,000, including equipment. The shop will be one story, 80 x 380 feet, and the foundry, one story, 80 x 240 feet, with three-story extension, 60 x 240 feet. The new buildings will be used for the manufacture of presses, auto parts, dies, etc. The company operates a brass and aluminum foundry, tool and grinding room, casting shop, tinning, soldering, plating and polishing departments.

The New York Testing Laboratories, which have been organized by L. R. Seidell, G. B. Jack, Jr., and H. H. Geist, formerly chief metallurgist, assistant chief metallurgist and chief chemist, respectively, of the Wright-Martin Aircraft Corporation, have in addition to their well equipped laboratories at 354 Mulberry street, Newark, N. J., opened up New York offices at 74-80 Washington street. In addition to chemical and physical testing and microphotography, this organization is specializing in the source inspection of materials, and as consultants in smelting, foundry, drop forging and heat treating practices and the metallurgical investigation of shop troubles.

NEW ROLLING MILL

On May first the Bridgeport Rolling Mills was opened for business. J. G. MacKay, one of the best-known men in the metal trade throughout New England, is the president and general manager of the new corporation. The plant, which is located at Bruce and Stratford avenue, Bridgeport, Conn., is one of the best equipped in the entire section.

The products to be produced by the Bridgeport Rolling Mills will include everything in the brass, bronze, nickel silver and copper lines. Associated with Mr. MacKay in the new enterprise is Homer D. Brunson of Waterbury, Conn., who will be treasurer. Mr. Brunson is also well known, hav-

ing formerly been at the head of the Brunson Manufacturing Company at Beacon Falls, Conn. Harold E. Leavenworth of the Bridgeport Testing Laboratories will act as chemist of the plant.

During the war the plant was operated by the Government in turning out large quantities of war materials, having been especially equipped for this purpose, and the plant was acquired by Mr. MacKay and his associates only recently. Much new equipment has been added to the already complete plant with its present large daily capacity.

The New York office is located at 141 Broadway to facilitate the handling of the domestic and export business, and is in charge of George E. Barrows as sales manager.

METAL PLANT SOLD

The entire plant of the **Metals Production and Equipment Company** of Springfield, Mass., has been sold to Augustus P. Loring, of Beverly, and A. W. Erickson, of Swampscott, Mass., two of the largest creditors of the corporation, the purchase price being $665,000.

They assume the bonded indebtedness on the property of $150,000, making the net amount they paid for the plant $515,000. The terms of the sale were considered good.

The buyers were the main creditors, the merchant creditors' claims amounting to only $74,000. Dividends of probably between 35 and 40 per cent of the claims of the creditors will be paid.

The affairs of the company have been in the process of adjustment in the bankruptcy court for the past few months since they were begun in the district court in Boston. The sale to the new buyers includes all the company's assets except accounts receivable, which amount to about $60,000.

The Metals Production Equipment Company is located in Brightwood, and at the plant are manufactured heat treatig furnaces. There is also a brass rolling mill. The plant will continue doing business as formerly and a prosperous future is looked for.

SALE OF SURPLUS MATERIAL

The Du Pont Chemical Company, Inc., Wilmington, Del., offers for sale the peace surplus of the E. I. Du Pont de Nemours & Company's plants, which include great power houses and mammoth plants, miles in length; standard and narrow gauge railroad track (one plant alone has sidetrack facilities for 1,000 cars), freight and passenger cars, gasoline and electric locomotives, automobiles, motor trucks, whole villages and cities for population of 3,000 to 30,000, machine shops, wood working shops, brass and aluminum foundries, laboratories, electric power and light plants, storage tanks, warehouses and lumber yards; homes and land; housefurnishings of all kinds, building material of all kinds; hotel, dormitory, club, restaurant, cafeteria, theatre and gymnasium equipments; contractors' machinery and tools, mechanics' tools, plumbing and electrical material, billiard, bowling and musical outfits, etc.

FINANCIAL REPORT

The seventeenth annual report of the **International Nickel Company,** New York, N. Y., for the fiscal year ending March 31, 1919, shows a total of assets of $62,911,883.69, liabilities $56,989,254, leaving a total profit of $5,922,629. During the fiscal year $3,480,210.48 was expended upon additional plant extensions and to complete construction already under way at the commencement of the year, all of which has been financed out of the treasury funds. All this construction has been completed except the dam serving the hydro-electric plant of the company in Canada.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence. Particulars of additional incorporations may frequently be found in the "Trade News" columns.

To manufacture metal products such as sheet, rod and wire, of copper and brass—West Virginia Metal Products Corporation, Fairmont, West Virginia. Capital $2,500,000. Officers: J. E. Watson, president; M. L. Hutchinson, vice-president and treasurer; George M. Alexander, secretary; all of Fairmont; Major James M. Doyle, vice-president, of 14 Wall street, New York. Ferdinand Deming is the engineer.

To manufacture electric fixtures and a general line of brass goods—The Metal Studios, Ltd., Hamilton, Canada. Capital $50,000. Incorporators: Samuel Nelson, Alfred Somerville, Joseph T. Payne, and others. The company operates a brass machine shop, tool and grinding room, cutting-up shop, spinning, stamping, brazing, soldering, plating, polishing, japanning and lacquering departments.

PRINTED MATTER

Nickel and Its Alloys.—The Electrical Alloy Company of Morristown, N. J., through its export department has issued a folder to the export trade. In this folder they call attention to the fact that Germany formerly furnished large quantities of nickel, nickel alloy wire and strips and that now this company is particularly well situated to furnish these materials. The company claims to have the largest mills in the United States devoted to the exclusive manufacture of these products, and it is stated that satisfactory prices and dependable service may be obtained for foreign clients.

Cleaners.—A. P. Munning & Company, 50 Church street, New York, has issued a very interesting bulletin No. 1100 which is devoted to descriptions of the extensive line of Munning cleaners. This company manufactures a complete line of cleaning compounds using methods and machinery which have been developed especially for the purpose. The ingredients are bought on exact specifications and are tested by graduate chemists in the company's employ, and as a result the product is uniformly good. These products are all adequately described in the bulletin under their separate names and as is said by the manufacturers, "there is a cleaner for every purpose."

Machinery.—P. Pryibil Machine Company, manufacturers of metal spinning lathes and wood working machinery, New York, has just issued catalog No. 19 descriptive of their wood working machinery and supplies. This catalog, as stated by the company, represents the last word in representation of this class of machinery. The catalog contains 192 pages including an index arranged in two parts and the various types of wood working machinery are shown by means of fine half tone engravings. Among the machines described in the catalog are a full line of spinning lathes and accessories, buffers and grinders and various forms of power transmitting machinery. Illustrated literature concerning any special line may be had upon request.

Enamels and Japans.—Bulletin No. 1 of black enamels and japans has been issued by the Hilo Varnish Corporation of Brooklyn, N. Y. The information contained in this booklet of twenty-two pages is of practical value to the manufacturers who use any kind of finishing materials on their products. This particular bulletin is devoted to a description and facsimile productions of black enamels and japans. There is also a very valuable chart of lustre standards, consisting of five samples which show the difference in lustre of black japans and enamels. These grades are indicated by high gloss, gloss, semi-gloss, rubber and flat. Other bulletins issued by this same company comprise colored lacquers, white enamels and military enamels, each of which may be had upon request.

DISPOSITION OF LEAD.

C. W. Hare, Director of Sales of the War Department, today announced that an informal arrangement has been made with Clinton H. Crane, Chairman of the Lead Producers' Committee of the War Industries Board, during the existence of that organization, whereby sufficient orders proffered the

lead producers will be allocated to the Department to take up, at current market prices, the surplus stock of pig lead acquired by the Government for war purposes.

In addition to the surplus of lead to be disposed of in this manner, the several bureaus of the War Department have on hand approximately 21 tons of sheet lead, and the several acid plants controlled by the Department have in stock 10,000 tons of heavy sheet lead, 25 tons of lead pipe and 6 tons of lead slabs, which has been declared surplus and is to be marketed by the Department without the assistance of the industry.

Such of this latter surplus as is in commercial shapes and sizes will be disposed of at the approximate market price. That portion which is not in commercial condition or size, will be marketed at a figure which will allow for conversion. Consumers interested in this surplus supply, should communicate promptly with the Office of Director of Sales, War Department, as an attempt is to be made to market immediately.

The Director of Sales also announces that he is seeking a market for 1,180 tons of antimonial lead and approximately 930 tons of antimonial lead scrap, which the Department is willing to dispose of at prices approximating those that obtain for such material in the open market.

CATALOG EXHIBIT

An exhibition of every kind of catalog may be seen at The Metal Industry office, 99 John street, New York. The Metal Industry is prepared to do all the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding, for the entire job from beginning to end or any part of it.

METAL STOCKS MARKET QUOTATIONS

	Par.	Bid.	Asked.
Aluminum Compan of America.....	$100	$500	$600
American Brass	100	235	240
American Hardware Corp.....	100	160	162
Bristol Brass	25	38	40
International Silver, com.....	100	25	25
International Silver, pfd.....	100	90	92
New Jersey Zinc.....	100	255	260
Rome Brass & Copper	100	280	330
Scovill Mfg. Co.....	100	420	440
Yale & Towne Mfg. Co.....	...	250	260

Corrected by J. K. Rice, Jr., & Co., 26 Wall street, New York.

METAL MARKET REVIEW

WRITTEN FOR THE METAL INDUSTRY BY W. T. PARTRIDGE.

COPPER

JUNE 9, 1919.

Confidence in the future was evident in all metal industries last month and activity in the copper market was greater than at any time since the war ceased. Among the largest buyers were wire drawers and electrical equipment manufacturers, who in ordinary times consume 60 to 70 per cent. of the entire output of copper. Power companies, who, because of war conditions, have been out of the market for a long time, also placed large orders for wire. Transactions on domestic account alone amounted to approximately 120,000,000 pounds, as compared with April sales amounting to about one-quarter as much. Sales for export during May are estimated to have been 30,000,000 pounds, as compared with about one-half as much in April. Combined domestic and foreign sales approximated 150,000,000 pounds, or about twice the amount sold during the March activity. Prices advanced sharply under active buying 1⅛ to 1¼c. per pound, but receded ⅛ to ¼c. in the last week of the month, making the net advance 1 to 1⅛c. per pound at the close, when Lake copper was firm at 16.75c.; electrolytic at 16.50c., and casting copper at 15.87½c. to 16c. per pound for spot, June and July deliveries. One-fourth cent premium per pound was asked for August and September positions. The lifting of the embargo against copper importations, made by France, late in the month was a favorable feature and with the signing of peace, it is believed that Germany will also come into the American market for considerable metal.

TIN

The outlook for resumption of activity in the tin market became a little clearer after the statement by Chief Armsby of the Tin Control of the War Trade Board was issued late in May. Of extraordinary interest and creating astonishment in many quarters was the announcement that on May 1, 1919, 22,000 tons of tin (including Inter-Allied metal, tin content of ores and tin concentrates) were held in this country by cosumers, jobbers, dealers and smelters. In addition to the over-supply here, 25,000 tons have been accumulated in foreign markets. Unsold U. S. Government stocks of tin as announced on May 23, were 2,199 tons. At the average monthly rate of consumption as reported to the Iron & Steel Institute—3,713 tons—Government holdings will have been disposed of before July 1, 1919. Nothing definite as to the exact date for the removal of restrictions on importations of pig tin has yet been given out. On May 28, the Government announced removal of restrictions upon importations of tin ores and tin concentrates to become effective at United States ports on July 1, 1919. For the first time in many months, Banca tin was offered for sale in this market, the metal to be held abroad until importations are again permitted. Prices during the month were unchanged, of course; Government figures being 72.50c. per pound. In the outside market small lots of Straits metal and of American pure tin were obtainable from time to time at 71.25c. per pound. For importation to be shipped when the import ban is lifted, 50.75 to 51.50c. per pound was asked at the close but as it is rumored that purchases made in this way become subject to further regulation by the United States Government, no acceptances of such offers were reported.

LEAD

The month opened with the outside market down to 4.60c. East St. Louis, 4.82½c. New York; the leading interest quoting 4.75c. East St. Louis, 5.00c. New York. In the absence of buying, outside prices were shaded, a little later, to 4.80c. in New York. With the report that the Producers Committee would be allowed to take charge of disposal of Government-owned stocks, which through uncontrolled offerings were regarded as a menace to trade, the tone became somewhat firmer in the second week. By the middle of the month, outside prices had recovered to 4.70c. East St. Louis, 4.95c. New York. On the strength of some buying and the general improvement in business otherwise, the leading interest advanced its official base 10 points and again, a few days later, 15 points, to 5.00c. East St. Louis, 5.25c. New York. The outside market on May 21 was quoted 5.00c. East St. Louis, 5.35c. New York, but a slackening of demand, which had been brisk, caused a weakening in the last week to 4.90c. East St. Louis, 5.20c. New York. The American Smelting & Refining Co. made no further change in its prices and the month closed with a net advance of ¼c. per pound.

SPELTER

The zinc market held firm, all things considered, during the past month; its main support was found in export orders, which, however, were not large in volume. Prices, after opening lower—6.00c. East St. Louis, 6.35c. New York, for prompt and early shipments—were steady until May 12, when English buying strengthened the tone and an advance began which carried to 6.30c. East St. Louis, 6.65c. New York by the end of the next ten days. On May 22, prices were shaded five points and the decline continued fractionally, from day to day, the close being 6.17½c. East St. Louis, 6.52½c. New York for prompt. Future positions were held at a premium of five points. The result of fluctuations was a net advance of 17½ points.

ALUMINUM

Increasing scarcity of metal, steady demand and unchanged

prices characterized the market last month. Carload lots of Virgin 98-99 per cent. were sold at 32-33c.; remelted 98-99 per cent. at 29-31c., and No. 12 remelted at 25-27c. per pound. Sheet aluminum, 18 gauge or heavier was 42.20c. and powdered aluminum, 51-61c. Motor, chemical, electrical and aeroplane industries, in addition to the regular pre-war demand of manufacturers, have opened a large and increasing field for the use of aluminum that will undoubtedly be continued.

ANTIMONY

Antimony prices opened at unchanged figures, 6.87½c. for prompt, duty paid, metal with improvement reported in consuming demand. May-June shipments from the Orient, at the same time, were held at 6.75c. With existing large stocks in strong hands and under control, prices steadily advanced under continued demand to 8.37½c. duty paid for prompt and nearby shipments by May 26, after which there was no further change. Shipment antimony at the close was offered at 7.75c. in bond. The total advance amounted to 1½c. per pound. Jobbing demand was fair throughout the month at prices about ⅛c. per pound more than wholesale figures.

SILVER

Fluctuations in the price of silver after the removal of Government restrictions, effective May 1, ranged from $1.01⅛, the fixed rate, to the highest point of the month, $1.19¾, which was registered on May 12. Gradually, a decline then carried to $1.04⅝, which was registered May 21. Immediately another rise began which carried to $1.08¼ in the closing days, making the net advance .07⅛c. Because of the Pittman Act, which compels the U. S. Treasury to buy silver at not less than $1.00 per ounce, for re-coinage of the silver dollars melted to meet a wartime emergency in aiding Great Britain to stabilize currency relations in India, it is generally believed that prices will range higher, rather than lower, over a period of many years.

QUICKSILVER

Prices of quicksilver advanced $17 per flask last month, from $75 to $92, the advance being accelerated by a sudden rise in London. Production in this country, after the war was over, was reduced to a 50 per cent basis of operations, but with prices that indicate a better profit, the output will now be increased.

PLATINUM

Steady demand for plantinum, which is not in abundant supply, caused an advance of $5.00 per ounce in prices during May to $105. Department of Commerce statistics for March reveal importations during that month, amounting to 3,980 ounces of unmanufactured platinum, valued at $334,208. Of the total amount received 2,065 ounces came from Colombia nd 1,390 ounces from England. The outgo from this country, according to the same authority, valued at $2,871, was principally to Canada.

OLD METALS.

The confident sentiment and initial activity that became apparent in the major metals markets in May naturally was reflected in the old metals trade, although in lesser degree. While prices were unchanged during the first fortnight, on the 16th, an advance began which included almost the entire list of items and which culminated in a rise of from ⅛c. (on tea lead) to 1¼c. per pound. Coppers were up ½c. to 14c. on strictly crucible; ¾c. to 11.75c. on light copper and 1¼c. to 13.50c. on uncrucibled wire. Cocks and faucets also advanced 1¼c. to 11.75c. Aluminums were in steady demand at unchanged figures for old metal, but up 1c. to 22c. for new scrap. Old scrap zinc, electrotype, heavy lead, heavy brasses and clean red car boxes were all up ½c. on each item, while a ¼c. rise was registered on stereotype and on brass turnings and clippings. Pewter, block tin pipe and new zinc were unchanged at 35c., 55c. and 5c. each, respectively.

WATERBURY AVERAGE

Lake Copper Average for 1918, 24.75. 1919—January, 23.00 February, 18.00. March, 15.50. April, 15.50. May, 16.37½.

Brass Mill Spelter. Average for 1918, 9.858. 1919—January, 9.00. February, 8.20. March, 8.00. April, 6.90. May, 6.80.

MAY MOVEMENTS IN METALS

	Highest	Lowest	Average
Copper—			
Lake	17.00	15.62½	16.298
Electrolytic	16.75	15.37½	16.006
Casting	16.25	14.90	15.492
Tin	72.50	71.25	71.940
Lead	5.35	4.80	5.049
Spelter (brass special)	6.40	6.10	6.214
Antimony	8.37½	6.87½	7.559
Aluminum	33.00	31.00	32.214
Quicksilver (per flask)	$92.00	$75.00	$82.00
Silver (cents per oz.)	119¾	101⅛	107.111

INQUIRIES AND OPPORTUNITIES

Under the directory of "Trade Wants" (published each month in the rear advertising pages), will be found a number of inquiries and opportunities which, if followed up, are a means of securing business. Our "Trade Want Directory" fills wants of all kinds, assists in the buying and selling of metals, machinery, foundry and platers' supplies, procures positions and secures capable assistants. See Want Ad. page.

Metal Prices, June 9, 1919

NEW METALS

	Cents.
COPPER—DUTY FREE. PLATE, BAR, INGOT AND OLD COPPER.	
Manufactured 5 per centum.	
Electrolytic, carload lots	17
Lake, carload lots	17¼
Casting, carload lots	16¼
TIN—Duty Free.	
Straits or Australian, carload lots	71¾-72½
LEAD—Duty Pig, Bars and Old, 25%; pipe and sheets, 20%. Pig lead, carload lots	5.20
SPELTER.—Duty 15%.	
Brass Special ..... nominal	6⅝
Prime Western, carload lots	6.5
ALUMINUM—Duty Crude, 2c. per lb. Plates, sheets, bars and rods, 3½c. per lb.	
Small lots, f. o. b. factory	...
100-lb. f. o. b. factory	...
Ton lots, f. o. b. factory	32.50

ANTIMONY—Duty 10%.	
Cookson's, Hallet's or American	Nominal
Chinese, Japanese, Wah Chang WCC, brand spot	8⅜
NICKEL—Duty Ingot, 10%. Sheet, strip and wire, 20% ad valorem.	
Ingot	40c.
Shot	43c.
ELECTROLYTIC	45c.
MANGANESE METAL	Nominal
MAGNESIUM METAL—Duty 20% ad valorem (100 lb. lots)	$1.90
BISMUTH—Duty free ..... nominal	$3.20
CADMIUM—Duty free ..... nominal	$1.40
CHROMIUM METAL—Duty free ..... nominal	
COBALT—97% pure	$3.00
QUICKSILVER—Duty 10% per flask of 75 pounds	$92.00
PLATINUM—Duty free, per ounce	$105.00
SILVER—Government assay—Duty free, per ounce	$1.09⅛
GOLD—Duty free, per ounce	$20.67